ECUADOR
Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Project Appraisal Document

Latin America and Caribbean Region
LCSFE

Date: August 15, 2001
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Project ID: P063644
Sector(s): PP - Electric Power & Other Energy Adjustment
Lending Instrument: Specific Investment Loan (SIL)
Theme(s): Energy; Private Sector; Telecom & Informatics
Poverty Targeted Intervention: N

Global Supplemental ID: P072527
Team Leader: Philippe J. Durand
Focal Area: G
Sector Manager/Director: Danny M. Leipziger
Supplement Fully Blended? Yes
Sector(s): DI - Private Infrastructure

Program Financing Data

[X] Loan **[ ] Credit** **[ ] Grant** **[ ] Guarantee** **[ ] Other:**

For Loans/Credits/Others:
Amount (US$m): 23.0

Proposed Terms (IBRD): Fixed-Spread Loan (FSL)
Grace period (years): 8
Years to maturity: 20
Commitment fee: 0.85% first 4 years, 0.75% thereafter
Front end fee on Bank loan: 1.00%

Financing Plan (US$m): Source	Local	Foreign	Total
BORROWER	4.81	2.15	6.96
IBRD	9.38	13.62	23.00
LOCAL SOURCES OF BORROWING COUNTRY	7.96	2.49	10.45
GLOBAL ENVIRONMENT FACILITY	0.44	2.40	2.84
Total:	22.59	20.66	43.25

Borrower/Recipient: REPUBLIC OF ECUADOR
Responsible agency: STATE MODERNIZATION COUNCIL
CONAM
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Other Agency(ies):
National Electricity Council (CONELEC), National Center for Electricity Control (CENACE), National Telecommunications Council (CONATEL), Superintendency of Telecommunications (SUPTEL), Ministry of Energy and Mines (MEM), Ministry of Trade and Industry (MICIP)

Estimated disbursements (Bank FY/US$m):

FY	2002	2003	2004	2005				
Annual	3.50	10.26	6.35	2.89				
Cumulative	3.50	13.76	20.11	23.00				

Project implementation period: 4 years (January 1, 2002 - December 31, 2005)
Expected effectiveness date: 01/01/2002 **Expected closing date:** 06/30/2006

GEF Grant: Project ID P072527

Estimated disbursements (Bank FY/US$M):								
FY	2002	2003	2004	2005				
Annual	0.30	1.45	0.80	0.29				
Cumulative	0.30	1.75	2.55	2.84				

OCS PAD Form: Rev. March, 2000

A. Project Development Objective

1. Project development objective: (see Annex 1)

The Project would support the Government's efforts to deepen reforms in the telecommunications and electricity sectors, by strengthening regulatory institutions, improving environmental management of the sector's activities, fostering competition, increasing private participation, promoting efficient use of energy, extending coverage in underserved areas and providing modern information technology (ICT)-supported services to micro and small businesses (MSB).

2. Global objective: (see Annex 1)

The GEF-funded components would promote private financing and management to reduce greenhouse gas emissions, by removing barriers to the use of: (i) renewable energy technologies (RET) to extend electricity supply in rural areas (GEF Operational Program No.5); and (ii) energy efficiency measures (GEF Operational Program No.6).

3. Key performance indicators: (see Annex 1)

The performance indicators are listed below and elaborated upon in annexes 1 and 1a.

Regulatory and institutional development in the telecommunications and electricity sectors

- Improved effectiveness of the Superintendencia de Telecomunicaciones (SUPTEL) and the Consejo Nacional de Electricidad (CONELEC) to regulate the sectors, and undertake timely public consultations and disseminations of regulatory decisions.
- Completed environmental regulations and procedures in the electricity sector and strengthened the capacity of CONELEC and other institutions including sector operators, to promote a better environmental management of sector activities.
- Establishment of liberalized wholesale electricity market (MEM in Spanish), as shown by a greater number of private operators in the power grid, a larger volume of transactions in the MEM, and a more efficient administration of the wholesale market by CENACE.
- Increased number of private operators providing rural telecommunications, decentralized rural electrification, energy efficiency services and ICT-based services to MSB.

Extension of rural electricity and telecommunications services

- Adoption of a sustainable strategy to extend electricity services, including efficient subsidization, financing and delivery mechanisms, and community participation.
- Successful completion of replicable pilot projects for rural telecommunications and electricity.

Expanded internet access and business services to MSB

- Successful completion of a replicable pilot project for information and communication technologies (ICT)-supported business development services to MSB in urban and peri-urban areas, showing improvement in MSB market outreach, competitiveness and growth.

Increased end-use energy efficiency

- Design and launching of a program to enhance efficiency in the use of energy.
- Successful implementation of demonstration projects with good replicability prospects.

Implementation of effective public consultations and information mechanisms

- Systematic consultation and dissemination of regulatory and privatization decisions.
- Growing public consensus in support of the Government's sector reform and privatization program.

GEF performance indicators

- Actual tons of CO_2 reduced through the energy efficiency program.
- Estimated tons of CO_2 expected to be reduced through the implementation of subsequent energy efficiency projects and through use of RET instead of fossil fuel-based rural electrification.
- Definition and adoption of a strategy, regulations and policies for the sustained development, with private participation, of (i) decentralized rural RET and (ii) enhanced energy efficiency.

B. Strategic Context

1. Sector-related Country Assistance Strategy (CAS) goal supported by the project: (see Annex 1)
Document number: 15419, March 25,1997 **Date of latest CAS discussion:** June 22, 2000 (Progress Report)

The Ecuadorian economy had been weak since the early 1980s, with falling GDP/capita and increasing public debt, due primarily to political instability, growing regional tensions and social unrest, which often paralyzed policy actions and lead to inadequate or even inappropriate policy responses. This was exacerbated by external shocks and natural disasters in the late 1990s, and finally resulted in Ecuador's default in September 1999. That year, real GDP fell by over 7% and real wages by 25%, while unemployment increased to over 16% and annual inflation to 60%.

The economic crisis had a profound impact on the poor. The poverty incidence increased from 29.2% in 1995 to 43% in 1998 and 69% in 2000, while the number of people in extreme poverty (insufficient income for a minimum food basket) doubled from 17% in 1997 to 34% in 1999. Poverty is highest in rural areas and among the indigenous and Afro-Ecuadorian population.

In March 2000, the Government announced an economic program to (i) restore confidence in economic management, (ii) stem the decline of economic activity and living standards, and (iii) lay the foundations for renewed growth. The centerpieces of the program are dollarization and structural reforms, including an enhanced role for the private sector.

The last CAS Progress Report was discussed by the Board on June 22, 2000, setting the Bank strategy for 2000-02. It responds to the difficult economic situation of Ecuador, by focusing Bank assistance on three objectives: (i) increasing social services and safety nets for the poor; (ii) restoring macro-financial stability and economic growth (through, inter alia, expanding the role of the private sector) and (iii) promoting sustainable development and productivity by the poor (including improved environmental management and rural development).

The proposed project, including its GEF component, will contribute directly to CAS objectives (ii) and (iii):

> ***ii. Restoring macro-financial stability and economic growth:*** The Project promotes competition and private participation in the provision of telecommunications, electricity, internet and business services, and supports the development of sound legal, regulatory and institutional sector frameworks. These policies will facilitate private sector growth and employment generation in these sectors, and more efficient delivery of services and hence a reduction in costs for other sectors. In addition, privatization of electricity will generate fiscal revenue and remove the current fiscal burden from government-owned companies in these sectors.

1a. Global Operational strategy/Program objective addressed by the project:

iii. Promoting sustainable development and productivity by the poor : The Project promotes RET for rural electrification and assists in the design and implementation of programs to promote energy efficiency and rural telecommunications. The Project also supports the Government's action plan to improve the environmental management of activities in the electricity and telecommunication sector, through (a) the design and implementation of specific environmental regulations, procedures and guidelines for the electricity sector; (b) the strengthening of the institutional capacity to address environmental issues of sector regulators, operators, and other institutions like MEM and CONAM, and (c) the development of information and monitoring instruments to facilitate the design and enforcement of environmental policies.

2. Main sector issues and Government strategy:

Background

Overview of the sectors (1999 Data): With 9.1 main telephone lines per 100 inhabitants (vs. 13.2 for LAC) and 82 faults per 100 main telephone lines per year (vs. 20 in Bolivia and 5 in Mexico), coverage and quality of telecommunications services in Ecuador lag behind regional averages. National coverage of electricity is relatively high (80% of total population), but Ecuador's power demand has been growing (despite the sluggish economy), it is expected to accelerate as the economy recovers, while generation capacity is having trouble keeping pace (especially during dry years, due to heavy reliance on hydropower), and transmission and distribution facilities have deteriorated. In both sectors, the rural coverage is low (there are only 1.6 main telephone lines per 100 inhabitants in rural areas, and 45% of the rural population has no access to electricity), which accentuates the urban-rural poverty gap. The lack of adequate services hinders the international competitiveness of Ecuadorian firms and limits the provision of education and health services.

Sector Reforms in the early 1990s. Ecuador initiated electricity and telecommunications reforms in the early 1990s, with the adoption of new sector legislation and regulations, the creation of regulatory and electricity wholesale market institutions, and the break-up of the national monopolies. The new laws and regulations include mechanisms to make services more accessible and affordable to the poor, as well as to make the power sector more environmentally sound. In 1993, Ecuador joined the United Nations Framework Convention on Climate Change (UNFCCC). The Bank provided support under the PERTAL. However, the initial effort to sell the new regional telecommunications companies, ANDINATEL and PACIFICTEL failed, and privatization of the electricity companies was delayed pending necessary tariff increases.

Main sector issues

Despite the advances achieved since the early 1990s, the reforms can only be completed and sustained if actions are taken to address the following issues:

Telecommunications

Incomplete legal and regulatory framework:

The 1995 reforms to the telecommunications law, important as they were, did not provide a complete and coherent legal framework for long term growth. The Government introduced to Congress a new draft

telecommunications law in 1999, that aimed to simplify and modernize current legislation. However, the Government withdrew this project a few days later due to lack of political support. The Government then changed its strategy, sending to Congress the minimum changes required in the current law to open the market to competition. The March 2000 Economic Transformation Law made further progress, as it dictated the end of exclusivity for the wireline operators. The rest of the reforms would be accomplished by changing the regulations to the Law.

Current regulations to the Law need to be updated, to protect new entrants against abuse from the incumbent operators, for example in the interconnection terms and conditions. As the Sector progresses towards full competition, CONATEL should aim at simplifying procedures to obtain new licenses. This would be critical to increase private sector participation in the Sector.

Although the cellular companies can compete effectively against ANDINATEL and PACIFICTEL by connecting international calls using their own networks, other fixed-service operators cannot. Because ANDINATEL and PACIFICTEL are unable to meet demand, these other operators rent facilities to private companies illegally. Legalization of this activity would contribute to transparency and facilitate fair competition among all participants. As a first step towards legalization, ANDINATEL and PACIFICTEL concession contracts were amended in April 2001 to remove the exclusivity provisions.

Current tariff levels are inadequate to cover the cost of local telephone services, which makes it difficult to attract badly needed private investment. At the same time, however, the recent economic crisis has made it more difficult for the poor to bear an increase in the rates. The 1995 law launched the process of tariff rebalancing and created special "popular tariffs," but these are ill targeted as they are based on location rather than income level. Local rates have remained significantly below costs, cross-subsidized by high international rates, but the latter are not sustainable in light of international competition.

Insufficient institutional capacity and cumbersome regulatory setup

Although the institutions created by law in 1992 and modified in 1995 are already functional, they are still building up their technical expertise and capacity to regulate and supervise the sector, to enforce proper environmental guidelines and to communicate with sector enterprises and consumers. The success of important measures, like the opening of the sector to new investors, and increasing access of the poor will depend heavily on the performance of the sector regulators.

There are four institutions in charge of defining sector policies and regulating the sector: CONATEL, SENATEL (which is *de facto* CONATEL's executive implementing agency) , CONARTEL and SUPTEL. While the unusual division between CONATEL as regulator and SUPTEL as monitoring agency may be viable, the division of the allocation and control of licenses between CONATEL (for telecommunications) and CONARTEL (for broadcasting services) is not consistent with the rapid convergence of all communication and information services.

Poor performance and financial weaknesses of operators

ANDINATEL and PACIFICTEL are the sole providers of fixed-line telephony (except in Cuenca). Since their creation in 1992, these government-owned enterprises have been slow in introducing new lines and services and in improving service quality, as they have lacked the financial resources and autonomy to make needed investments. Their financial weaknesses are due primarily to overstaffing, inadequate local tariffs, and, in the case of PACIFICTEL, weak management. This has made it difficult for the two operators to compete effectively with private cellular companies in local telephony.

Shortfalls of previous privatization effort

The attempted sale in 1997-98 of 35% of the shares of ANDINATEL and PACIFICTEL failed because no investors would meet the base price of over $2,000/line. This floor price was high relative to those set in other LAC countries, especially in light of (i) the low initial local rates and high investment obligations under the proposed concessions, (ii) sharply reduced accounting rates on calls to the U.S. (as set by the U.S. Federal Communications Commission), (iii) the small size of the separate ANDINATEL and PACIFICTEL operations, (iv) the fact that only a minority share (35%) of the companies was for sale, (v) the limited credibility of the 1997-98 transition government, (vi) the major turmoil in international financial markets then, and (vii) legal and constitutional challenges to the changes in the Telecommunications Law.

Electricity

Gaps in the regulatory framework

While the overall reformed framework is satisfactory, specific regulations need to be elaborated and applied, especially on (i) tariff setting and transmission charges, (ii) the operation of the wholesale market, (iii) defense of competition, (iv) environmental management, and (v) rural electrification. Also, as the segmentation of the state monopoly INECEL was delayed until early 1999, the Government still needs to resolve the financing of severance payments for terminated INECEL staff.

Weak institutional capacity

While CONELEC and CENACE have been operating since 1998 and 1999, respectively, both entities need to improve considerably their procedures and technical capacity, inter-agency relationships, and dealings with sector enterprises and consumers, in order to: (i) ensure adequate protection to investors and consumers, (ii) foster the introduction of effective competition, (iii) extend services in rural areas, and (iv) mitigate the environmental impact of activities in the sector.

The Electricity Law grants CONELEC specific attributions to supervise environmental management in the sector, in coordination with the Environment Ministry, which is the main authority in the field. While CONELEC has the necessary expertise to regulate and supervise environmental impacts, responsibilities are presently fragmented within CONELEC without sufficient coordination between two different departments. The lack of coordination precludes a coherent application of environmental policies and has often resulted in conflicting criteria for environmental impact assessments. CONELEC's institutional weakness on the environmental front has been compounded by the lack of appropriate information and monitoring systems (guidelines, databases and equipment). The lack of information on air quality, acid rain and other environmental parameters, and the insufficient development of instruments to assess and monitor electricity projects limit the effectiveness of environmental sector regulations to appropriately mitigate the environmental impact.

Inadequate tariffs

Electricity prices on average cover only 55-60% of economic costs. During November 1999-May 2000, tariffs were frozen despite rapidly accelerating inflation, and fell to less than one-third of economic costs. On May 24, tariffs were increased by 70% in average, but consumption is up to 300 kwh/mo. in the Andean region and 400 kwh/mo. in the Coastal region remained subsidized. These ceilings for subsidies are inordinately high, and benefit mainly the better off -- low-income households rarely consume above 200

kwh/mo. The resultant total subsidization for consumption of electricity was nearly US$300 million (1.5% of GDP) in 2000. The one time increase in tariffs was followed by regular monthly increases of 4% for those levels of consumption that were still subsidized. So far, the tariff adjustment program of the Government has resulted in a 3.25% monthly increase of the average tariff, from Usc 4.2 per Kwh in June 2000 (after the initial increase) to 6.4 per Kwh in July 2001 (On October 30, 2000, CONELEC did not accept a request from the distribution companies for an additional 30% increase, pending an evaluation of the cost information). With this gradual adjustment program, the Government expects tariffs to reach the economic cost of electricity by December 2002. However, realignment of tariffs with economic costs may take longer or shorter depending on actual inflation rates and fuel costs.

Sub-optimal investment in the sector.

Inadequate tariffs over extended periods have lead to a serious deterioration of the financial position of the sector enterprises. Distribution enterprises are the most directly affected, but they in turn are late in paying the generation and transmission entities. These financial problems, and the weak planning capacity of the sector institutions, are two major reasons why expansion of generating capacity has not kept pace with demand, and investment has traditionally been high cost in order to meet emergency needs, rather than part of a least-cost expansion plan. The Transmission System is currently operating under critically weak conditions due to the delays in the required system maintenance and the execution of scheduled improvements, the limitations of the existing integrated grid that are affecting the quality of services, and the fiscal limitations of Transelectric that prevent the optimal expansion of the grid. Some US$200 million/year in new generation capacity will be required during 2001-03 to meet demand, with a similar investment need for distribution and transmission.

Lack of access to electricity in rural and remote areas

In 1999, 80.3 percent of the population in Ecuador had access to electricity, but this national average hides a huge rural/urban gap: 95.8 per cent of the urban population, but only 54.9 per cent in the rural zones. According to the current 2000-09 Electrification Plan prepared by CONELEC, coverage is expected to increase in the rural areas up to 65% over ten years. However, this Plan presents two important shortcomings. First, and most important, the Plan in its current version only considers increases in coverage achieved through grid extensions, which will be financed in part by FERUM. The Plan does not include options for developing off grid projects to reach populations away from the grid, and there is no financing mechanism, similar to the FERUM, that could ensure their financial sustainability. There is, however, also a need to reach these areas far from the grid, where the use of RET is the efficient solution. In these remote areas, where the population lacks as well other infrastructure such as roads, telephones, potable water and easy access to health and education, the social and economic benefits of electrification may be high, but there are many barriers to service, such as: (i) weak government capacity for development and implementation of an electrification strategy for these areas, (ii) high first-cost of RET relative to consumers' ability to pay, and lack of financing/credit systems to facilitate purchase, (iii) lack of financial motivation, appropriate cost structures and regulatory obligations for existing distribution utilities to serve dispersed populations, and (iv) lack of other established commercial enterprises which understand and are willing to serve such markets. A second shortcoming of the Plan is the absence of reliable and updated statistics, as the basic data stems from the 1990 Census, and this imposes a serious limitation to the usefulness of the current Electrification Plan as a tool to program, monitor and evaluate the progress achieved in extending electricity services to the most rural and remote areas in the country.

Low level of implementation of environmental guidelines

While the overall legal framework is satisfactory and reflects a coherent policy to promote sound environmental management in the electricity sector, actual implementation has lagged behind due to the lack of specific environmental regulations and procedures, week institutional capacity of CONELEC in this field, and the absence of instruments to assess the environmental impact of projects and monitor compliance. As an example, official guidelines for environmental audits of the firms in the sector have yet to be adopted, most of the environmental impact assessments (EIA) of electricity firms approved so far are not subject to monitoring, and environmental audits of the firms to be privatized are by and large incomplete. Furthermore, there has been scant community participation in the different stages of the EIA due in part to the absence of a promotion campaign and the lack of established participation mechanisms.

Inefficient Use of Energy

Due to a history of energy subsidies, the efficiency of both electricity and fuels use in Ecuador is very poor, as shown by both the wasteful habits of end users and the high energy consumption of existing lighting, appliances and equipment in homes, buildings and factories, or currently available in the marketplace. Rising electricity prices should begin to change attitudes regarding electricity usage and associated equipment purchase. Nevertheless, to optimally improve its energy efficiency, Ecuador must correct the lack of: (i) additional financial incentives, such as rebate programs for higher-first-cost but energy-efficient residential and commercial lights, or more sophisticated time of use tariffs for industry; (ii) a general understanding (in all end-use sectors) of energy costs and how these can be reduced; (iii) availability of more energy-efficient appliances such as refrigerators and air conditioners, and standards and efficiency labeling for these equipment; (iv) institutional and technical capacity in government and private sector institutions to develop a strategy to address efficiency needs, with involvement of stakeholders; and (v) economic pricing of some fuels such as LPG, the primary household fuel for cooking and water heating.

ICT-supported Services for Micro and Small Businesses (MSB)

Lack of access to ICT adapted to MSB needs

E-readiness indicates the degree to which a country is prepared to participate in the Networked World. It is gauged by assessing a country's relative advancement in the areas that are most critical for ICT adoption (e.g., network connectivity, ICT policies, and ICT skills) and in the most important ICT applications (e.g., use of the Internet). Ecuador ICT environment is less developed than the ICT context of most other Latin American countries. Ecuador faces a number of challenges as it attempts to overcome the ICT gaps between itself and its more advanced neighbors, as well as reduce its internal ICT gaps (i.e., between the rich and the poor, between urban and rural areas, and among large, small and micro businesses).

The essential steps that Ecuador must take in order to improve its overall "e-readiness" and to reduce the ICT gaps among various segments of its population are: (i) increase access to ICT infrastructure; (ii) develop specific on-line local content (e.g., at the country, region and city level, as well as industry- and sector-specific local content); (iii) foster development of e-government and e-commerce; and (iv) enhance competition in its telecommunication sector and improve ICT-related policies. These issues are discussed in more detail below (data sourced primarily from the EIU, 2001):

- *Access to phone computers and the internet.* 9% of people in Ecuador (versus 21% in Chile and 16% in Colombia) have a fixed phone, 3% of people in Ecuador (versus 14% in Chile and 8% in Colombia) have a mobile phone, 2% of the population own a computer (versus 7% en Chile and 3% in Colombia) and there are 29 internet users per 10K people (versus 467 internet users per 10K people in Chile and 158 in Colombia).
- *Telephone and internet costs.* In 1999, *t*elephone charges in Ecuador were very low, only $0.01

per a local call of 3 minutes, (versus $0.12 in Chile and $0.04 in Colombia). The low telephone charges are due to the fact that the telephone system has not been privatized yet. There are currently 27 ISPs in the country (the largest ones are: Satnet, AcccessInternet, Ecuanet and Andinanet). Although the cost of internet access has been decreasing since 1998, Independent Service Providers (ISP) charge $25-$36 per month for unlimited use, plus 12% value added tax and 15% of other taxes. Unete, one of Latin American largest ISPs, plans to enter Ecuador and offer free access to internet this year, which would increase the number of internet users and would likely seriously challenge the local major ISPs.

- *On-line local content*. Both local and international ISPs and online companies have been developing local web sites in Ecuador. The most popular sites are the portals: ecuadorexplorer.com, ecuador.com., quito.com and a few ISP sites, such as: satnet.com, ecua.net.ec, ecuanex.net.ec, accessinter.net, ecuanet.net, andinanet.com. However, despite the existence of sites providing local information, there is still a strong need to develop web sites providing industry- and sector-specific information, as well as information at the regional and local level. A strong collaborative effort between the private and the public sector is needed to create web sites offering relevant local content.
- *E-commerce.* Low credit card and PC penetration rates, along with inadequate communications infrastructure, hinder the ability to develop a mass consumer culture for e-commerce. There are only 30,000 estimated card holders in Ecuador and only about 2.8 million people have checking accounts. Ecuadorean companies have been slow to invest in business to business (B2B) commerce. The country's first B2B e-commerce site was launched in June 2000 by Metamorf, a local firm operating in the fresh-cut flower industry, Ecuador's six largest export. Florastream.com is a virtual marketplace for flower exporters and buyers. More than 100 of the country's 200 exporting plantations are now participating. In May 2000, Petroecuador, Ecuador's state- owned oil producer, announced that it was considering selling over the internet.
- *E-Government.* The Ecuadorean Government has not moved as quickly as other Latin American Governments to take advantage of opportunities offered by the Internet. Various Ecuadorean Government agencies have developed their own web sites where businesses and citizens can find information on the Government's activities and services (e.g., http://www.micip.gov.ec.) However, no agency in Ecuador has yet given businesses and citizens the opportunity to receive and pay for public services online. In Chile, by contrast, all Government departments are already required to purchase goods and services online through the government's procurement site; furthermore, in 1999, 26% of Chilean citizens completed and delivered their tax forms via the Internet.

Communications with stakeholders

Weak communications capacity

CONAM, and the regulatory agencies of the telecommunications and electricity sectors have not been able to develop and implement an effective communications strategy with stakeholders on the reform and privatization program. Professional communications skills - except in journalism - are scarce in Ecuador, and the value of key functions such as strategic communications, opinion research, and social marketing has yet to be recognized.

Lack of public understanding and support for reforms

As a result of this lack of dialogue with stakeholders on the reform programs, wide segments of the population have little understanding of the costs and benefits of regulation and privatization of the telecommunications and electricity sectors. The resultant suspicion of and opposition to the reforms, especially to privatization, has been a serious obstacle to the Government's efforts.

Government Strategy

The Government is committed to reducing poverty and reactivating the economy by deepening the sectoral reforms started under previous administrations (1995-99), promoting Ecuador's integration into international markets, and fostering private participation. To help achieve this, the administration has adopted a development strategy in the telecommunications and electricity sectors that extends the market-oriented reforms initiated in the early 1990s and addresses explicitly the most critical issues still pending in each sector, as discussed above. Specifically, the strategy in the two sectors has five main objectives:

- completing the legal and regulatory frameworks and strengthening the regulatory and supervisory agencies to provide a stable environment with clear rules that will attract investment while protecting consumers and investors;
- opening the sectors to new investors, starting with issuing new licenses for mobile telecommunication services, hiring private companies to manage ANDINATEL and PACIFICTEL, and going forward with the privatization of the electricity generation, transmission and distribution firms, starting with 17 distribution companies;
- improving living standards of the poor and broadening opportunities for MSB by extending access to electricity, telecommunications, internet, and ICT-based business services in rural and peri-urban areas.
- implementing environmentally sound policies in the electricity sector that reduce pollution and the emission of CO_2. To this end, the Government will undertake campaigns and implement investment programs to support the supply of renewable energy technologies (RETS) and more energy-efficient equipment and facilities.
- developing effective communications and consultation mechanisms in order to build social consensus around the reform programs in the two sectors.

Telecommunications. The March 2000 Economic Transformation Law increased the allowed level of private participation in ANDINATEL and PACIFICTEL from 35% to 51%, while eliminating the existing exclusivity arrangements for the provision of basic services. On these bases, the Government plans: (a) to issue new licenses for mobile services to compete against existing operators; (b) to attract private companies to manage ANDINATEL and PACIFICTEL through long term management contracts; (c) to improve regulations of the sector by engaging consultants to make a full review of critical regulations, like interconnection of operators, to stimulate competition; (d) to re-balance rates, through CONATEL's Resolution 456 of October 7, 2000 that authorized tariff re-balancing by semi-annual adjustments to end December 2002; (e) to avoid overlapping of responsibilities between regulatory entities, in charge of Radio and TV Broadcasting (CONARTEL) and Telecommunications (CONATEL); (f) to award concessions to new companies to operate fixed and wireless services, in competition with existing and new providers, without any exclusivity; and (g) to promote universal service, through CONATEL awarding direct subsidies to the companies that win bidding processes offering the minimum subsidy for investments to extend telecommunication services to rural areas. In accordance with legislation already in place, CONATEL manages a fund to extend telecommunications services in rural and peri urban areas (FODETEL), which is funded with contributions from all service and network operators of 1% of annual gross revenues (the percentage to be reviewed by CONATEL every five years based on need).

Electricity. CONELEC is implementing regulations to (i) create a liberalized wholesale market for electricity, (ii) promote the creation of competitive structures in the sector and prevent anti-competitive behavior, (iii) move tariffs closer to long run marginal costs, and (iv) improve the environmental management of the sector. The Government has also decided to privatize the sector both through: (i)

selling majority participation in existing generation, transmission and distribution enterprises; and (ii) inviting new private investment in generation. It has initiated the privatization process through assessment of the relevant legal, financial, and technical issues, and the preparation of the promotion campaign, with the assistance of a reputable firm of international specialists. The Inter-American Development Bank (IDB) is financing these advisors and providing technical advice. The Government has adopted an action plan to improve the environmental management in the sector, based on a recently completed assessment of the existing legal, regulatory and institutional framework in this field, (See Annex 11 for a summary of the diagnostic and recommendations of the assessment). It has prepared the *Reglamento Ambiental para Actividades Eléctricas*. The *Reglamento* addresses most of the bottlenecks, highlighted in the assessment, starting with the creation of Administrative Unit or Department within CONELEC, which will be in charge of handling all the environmental issues (Art 7). It also confirms the respective responsibilities of the Environment Ministry and CONELEC, and mandates a close coordination between the two institutions (Art.9).

Rural electrification. The Government is committed to the extension of electricity service, using private/public partnerships. CONELEC and MEM-DEREE will improve the 2000-09 Electrification Plan to design a coherent strategy that will consider both expanding coverage through grid extensions and through the implementation of off-grid projects with RETs. It is expected that grid extensions will connect about 750,000 additional households, will be implemented by the distribution companies through extension of the existing grid, and will be financed in part through the FERUM, with resources principally from levies on commercial and industrial users. In addition, CONELEC and MEM will define a strategy to reach the areas far from the grid through off-grid decentralized projects with participation of private providers and promotion of RETs. They will also explore financing mechanisms for the off-grid projects to ensure their long term sustainability. Within the framework of the Peru-Ecuador Bilateral Technical Committee on Energy and Mining, a PV-based Rural Electrification Program (of US$13.8 million) aims to provide RET-based electricity to communities on both sides of the border. Also, in July 2000, the MEM and the Ministry of Health jointly prepared a US$0.45 million program for the installation of PV-based electricity systems for medical refrigerators in 94 remote clinics.

Energy efficiency. Also within the framework of the Peru-Ecuador cooperation, MEM proposed the 2000-05 Energy Saving Program for Ecuador (of about US$4.4 million) to: (i) improve the energy efficiency of the power system itself; (ii) create a culture of rational use of energy among the population; (iii) increase Ecuador's industrial competitiveness; and (iv) protect the local and global environment. This program has a potential to reduce peak demand for electricity by about 150 MW.

Support for MSB. The Government, through the Ministry of Commerce, Industry and Fisheries (MICIP), is committed to promote modern ICT-based business services as part of its assistance to MSB. It will build on the existing pipeline of MICIP programs for MSB, some of which are undertaken in conjunction with NGOs such as the Camara Nacional de Microempresas (CANAMIEC), the Centro de Promoción y Empleo para El Sector Informal Urbano (CEPESIU), the Fundación Ecuatoriana de Desarrollo (FED), and the Corporación Femenina Ecuatoriana (CORFEC). MICIP also manages the World Bank-financed International Trade and Integration Project, which is supporting a large number of microbusinesses in Ecuador to develop direct or indirect exports. It also has worked with PEOPLink, an INFODEV-supported US-based NGO, which acts as a direct on-line marketing service for grassroots producers in Ecuador and other countries by displaying their products digitally on its web site.

Communications. The Government is now well aware of the need to develop systematic channels of public consultation and dissemination of the major regulatory decisions and sector programs in order to increase social acceptance of the reforms, especially in light of the failed first attempt at privatization and

the need to raise tariffs. To this end, the Government has decided to strengthen CONAM's communications capabilities and to devise a comprehensive communication and information strategy. This strategy will include: (i) research on stakeholders' perceptions vis-a-vis reforms in general and the controversial aspects (i.e., tariff increases; sale of state-owned enterprises to foreign investors; retrenchment of surplus labor) in particular; (ii) media campaigns to inform the public about past, ongoing and planned measures; (iii) seminars and workshops directed at members of the National Congress, labor unions, indigenous groups, and NGOs, with a view to building consensus on the principal reform issues; and (iv) programs aimed at the employees of the enterprises slated for privatization.

3. Sector issues to be addressed by the project and strategic choices:

The project would support the Government's efforts to address the above issues by:

- completing the legal and regulatory framework with the definition and implementation of specific regulations and procedures for the operation and expansion of the sectors and for the mitigation of environmental impacts.
- strengthening the entities in charge of the sectors in order to increase the effectiveness of economic, technical and environmental regulation.
- promoting competitive markets and private sector-led growth in order to enhance efficiency in the provision of services and attract the resources needed for expansion.
- ensuring that the rural poorest also benefit from the sectoral reforms, by adopting a sustainable strategy to extend rural telecommunications and electricity services, and piloting programs to test the effectiveness of delivery and financing mechanisms.
- assisting MSB through the provision of internet access and ICT-based business services.
- ensuring that environmental considerations are incorporated into sector policies and investment decisions, promoting the use RET for rural electrification, and promoting efficient use and conservation of electricity.
- assisting CONAM and the sector regulatory institutions to strengthen their capacity to consult and communicate with the various stakeholders affected by the reforms in the two sectors.

C. Project Description Summary

1. Project components (see Annex 2 for a detailed description and Annex 3 for a detailed cost breakdown):

The project will have 4 major components, supporting the key areas in the Government's reform strategy.

1. Strengthening of the legal/regulatory/institutional frameworks in telecommunications and electricity

Telecommunications:

i. Strengthening SUPTEL to supervise the sector, undertake timely public consultations and dissemination of regulatory decisions, and financing necessary software programs and equipment to undertake effectively its supervisory functions.

ii. Preparation of a telecommunications tariff rebalancing plan.

Electricity:

i. Strengthening CONELEC and assisting it in the completion of electricity regulations and procedures.

ii. Assist CONELEC and other sector institutions to improve sector environmental management, by completing regulations and guidelines, strengthening institutional capacity, and developing information and monitoring instruments.

iii. Promote the development of a liberalized wholesale electricity market (WEM) by supporting CENACE's effort to improve the administration of the WEM with (a) the application of appropriate rules for the WEM's operation; and (b) acquisition of necessary software and hardware.
iv. Preparation of selected studies and support activities in the electricity sector, including technical studies, tariff studies, a study on the impact of the energy prices on the cost of living, and others to be defined during project implementation.

2. Extension of services to low income groups and MSB in rural and peri-urban areas

i. Pilot telecommunications projects in rural and marginal urban areas to be financed through FODETEL.
ii. Development by MEM-DEREE and CONELEC of a national electrification strategy comprising both grid-extension and off grid projects.
iii. Pilot Projects for decentralized off-grid RET-based systems.
iv. National E-readiness assessment (review of regulations and IT inventory).
v. Pilot projects to develop business centers with computer and internet access and ICT-based business services to MSB in peri-urban and large rural communities.

3. Design and implementation of a program to promote efficient use and conservation of electricity

i. Identification of barriers to efficiency enhancement, through surveys on electricity demand and efficiency enhancement options;
ii. Strategies and policies to remove barriers, including (i) tariff incentives to enhance end-use efficiency; (ii) standards for efficient design and use of buildings and electrical appliances, including appliance labeling; (iii) public information and training of management and operational staff, and (iv) support to the formation of local energy service companies (ESCOs), through relevant market assessment and training.
iii. Demonstration projects in textiles factories, public lighting, hotels, commercial centers, etc.
iv. Monitoring and evaluation of the entire program.

4.Effective Project Management and Consultation and Communications Campaigns

i. CONAM communication and consultation campaign with stakeholders and relevant civil society organizations on the Government's aims and policies in regard to the reform and privatization program.

ii. Action plan to strengthen the capacity of CONAM, SUPTEL and CONELEC, to undertake timely public consultations on major regulatory decisions, and systematically disseminate sector programs, regulatory decisions and procedures.
iii. General project coordination and management by CONAM with the support of the different participating entities (CONATEL (FODETEL), CONELEC, CENACE, MEM-DEA and MICIP/Steering Committee).
iv. Monitoring and Evaluation
v. Audit of project accounts.

Component	Sector	Indicative Costs (US$M)	% of Total	Bank financing (US$M)	% of Bank financing	GEF financing (US$M)	% of GEF financing
A. Strengthening of legal, regulatory, and institutional framework		12.80	29.6	10.29	44.3	0.00	0.0
B. Extension of Services to Low-Income Groups and MSB		13.82	32.0	7.35	31.6	1.61	56.7

C. Energy Efficiency D. Project Management and Communication and Information Campaigns		7.11 9.28	16.4 21.5	0.51 4.86	2.2 20.9	1.23 0.00	43.3 0.0
Total Project Costs		43.01	99.5	23.01	99.0	2.84	100.0
Front-end fee		0.23	0.5	0.23	1.0	0.00	0.0
Total Financing Required		43.24	100.0	23.24	100.0	2.84	100.0

2. Key policy and institutional reforms supported by the project:

Telecommunications

- SUPTEL institutional strengthening.
- Rural telecommunications development, through demand evaluation and development of financing instruments (FODETEL) to improve access to service, including through community telecenters.
- Improvement of sector regulations to attract private sector participation and enhance consumers' protection.

Electricity and Energy Efficiency

- Modernization of the legal/regulatory/institutional framework to establish a competitive, market-oriented system, based on arms-length regulation and majority-private enterprise.
- Creation of a wholesale market and retail markets based on competitive generation and open access to transmission and distribution (which are to be regulated as natural monopolies).
- Tariffs based on economic (long-run marginal) cost, with protection of the poor via targeted subsidies.
- Strengthening of CONELEC for arms-length regulation.
- Strengthening of CENACE for operating and administering the competitive wholesale market.
- Improvement of Environmental Management in the Electricity Sector with the preparation and application of environmental regulations, development of information and monitoring instruments, and the strengthening of the capacities of CONELEC and other institutions to address environmental issues

- Extending electricity supplies in rural areas, using RET when appropriate.
- Enhancing the efficiency of electricity end-use

ICT-based Services

- Improve intellectual property protection for development of the local IT industry, particularly with regard to software piracy.
- Development of e-commerce legislation incorporating legal obligations related to digital signature.
- Improved data privacy and consumer protection for e-transactions.

Communication and Consultation

- Enhancing consultation on policy decisions affecting wide segments of the population.
- Strengthening the effectiveness of CONAM in communications.

3. Benefits and target population:

General. Through improving telecommunications and electricity services, the Project would contribute to development and the quality of life, by improving health and education services and strengthening public administration. Residents of rural areas would obtain access to telecommunications and electricity. Consumers and investors would benefit from strengthened regulatory enforcement and more transparent and accountable procedures, which reduce the risks of arbitrary decisions. Citizens at large will also benefit from the improved environmental management of resources in the two sectors.

Public Finance. Public expenditures would be reduced by the streamlining of the regulatory and enforcement agencies, and their becoming financially self-sustaining via levies on the sector enterprises. Greater competition would lead to improved and expanded services, thereby stimulating economic growth and generating additional government revenues from operator licenses and a broadened tax base.

Telecommunications. The Project would increase the availability of telephone lines and access to internet and other communications services both in urban and in rural areas. The introduction of competition and more efficient regulation would serve to control the cost of services and improve the quality and scope of services. Businesses, in particular, which increasingly depend on telecommunications, would benefit from lower fees for interconnection and international communications and greater variety of value-added services. SUPTEL's enhanced capacity to manage the radio spectrum would ensure the availability of frequencies, reduce radio interference, make private investment in wireless technologies more attractive, and improve the quantity and quality of services.

Micro & Small Business. The project's ICT-based business development centers would benefit MSBs located in areas that: have a high concentration of low-income and indigenous MSBs. The centers would be located mainly in smaller towns and rural areas in Cuenca, Ambato, Los Rios, Otavallo, Banos, Santa Elena, Tena and Esmeraldas, which have high concentrations of microbusinesses producing artisan goods, textiles, grains and tourism services. The Micronet Centers' hub will be located either in Quito or in Guayaquil. The Centers will benefit MSBs located in the host towns, as well as MSBs located in the surrounding rural areas (about 30 km from the towns). While varying by business sector, in general, they would be expected to benefit from the Project by developing more direct business connectivity with higher income markets in the form of acquiring market research and more far-reaching market promotion of their goods and services. Transaction and product costs would be reduced through use of electronic (mainly) business-to-business trading and logistics. The combined use of microbusiness software and coaching for business planning, production and financial management would help to business practices and competitiveness, leading progressively to growth in client bases, sales and profitability.

Electricity. Electricity consumers would benefit from: (i) more efficient, higher-quality, and environmentally sustainable service; and (ii) extension of supplies to unserviced rural areas. The risk of future power shortages would be reduced. The project will develop an overall implementation strategy for decentralized rural electrification, and contribute directly to improved living conditions in rural remote areas, through the installation of photovoltaic systems for some 2,000 households and 350 public service installations such as schools and health clinics. Direct CO_2 emission reductions from this component would total at least 25,000 tons over the project life.

Energy Efficiency. This program will result in significant reductions in electricity end use and associated GHG emissions (see details in Annex 4a). This will start small through the project's demonstration activities, and expand substantially through application in the residential, commercial and industrial sectors. The project also assist the commercial and industrial sectors in reducing their costs of production

and becoming more competitive. Improved end-use of electricity by customers in all sectors will help compensate for average tariff increases.

4. Institutional and implementation arrangements:

Implementation responsibilities. CONAM's Public Enterprise Reform Unit (UEP) will coordinate and orient project implementation and will handle procurement and disbursements, in order to ensure appropriate management of this multi-sectoral project. CONAM's capacity to manage infrastructure reform projects was demonstrated by its success in advancing reforms since 1994. CONAM performed well in the implementation of PERTAL and the execution of PPF-financed preparatory activities. CONAM is charged with overall design and oversight of reform and modernization of the telecom and power sectors, including privatization of the power sector (with IDB support), opening of the telecommunications sector to competition and promoting private participation in Government-owned telecom companies. CONAM will design and implement a communication, participation and consultation strategy regarding power and telecom sector reforms and coordinate similar activities within regulatory and policy agencies in these sectors.

Project components that aim to strengthen the regulatory framework in the power and telecom sectors will be implemented by the sector regulatory and supervisory agencies -- SUPTEL for telecommunications, CONELEC for electricity. The Environment Management Unit, to be established with CONELEC, which is being constituted within CONELEC, will be responsible for the strengthening of environmental and social management in the electricity sector, in close coordination with the Ministry of Environment. CENACE will implement the component to strengthen its ability to administer and monitor the wholesale market in the power sector. CONATEL, will be responsible for the implementation of the rural telecommunications component, including design and conduction of bidding to select private operators, as well as the administration of FODETEL, subsidy allocation and service administration. MEM-DEREE will be responsible for the implementation of the energy efficiency and decentralized rural electrification components, in close collaboration with CONELEC and in consultation with the private sector and potential beneficiaries. MEM-DEREE and CONATEL will collaborate to identify and implement options for joint delivery of rural telephony and electrification services. The ICT-based project pilots for MSB will be prepared and supervised by a steering committee lead by MICIP, and composed of representatives of CONAM, private business, community organizations, the ICT technical community and World Bank experts. MICIP, in close collaboration with CONAM, will (i) manage the design and implementation of the pilot projects, (ii) manage the review of relevant public policies; (iii) ensure electricity/telecom/microbusiness coordination for the ICT component, and (iv) define financing policies to support the project.

The detailed arrangements for project implementation and monitoring are presented in the Project Implementation Plan (PIP), that was prepared by CONAM and reviewed and approved by the Bank during negotiations. The PIP also includes indicators to monitor the performance of the sectors, project implementation and the agencies participating in the project, as well as disbursements schedule and the procurement plan. During negotiations agreement was also reached on the final Operational Manual, including procedures for procurement and disbursement under the loan and GEF grant.

Project Preparation. The Bank has extended a US$2.0 million Project Preparation Facility (PPF) to the Government to finance project preparation, especially the development of regulations in the two sectors, tariff studies and UEP consultants. The GEF has granted US$0.35 million from its Project Development Fund (PDF B) to finance the preparation of the energy efficiency and rural electrification components. The Government has obtained a US$0.7 million Japanese Grant (PHRD) for the preparation of the ICT

component and the elaboration of a communication and consultation strategy. The three facilities are implementing satisfactorily by CONAM.

Financial Management, Disbursements and Accounts. CONAM's UEP will be responsible for central handling of project accounts and information, budgeting, preparation of financial reports, contracts supervision, and establishment and operation of internal controls. Two Special Accounts will be established for the project at the Central Bank or in a commercial bank, in accordance with Bank policies and procedures, one account for the IBRD loan and the other for the GEF grant. Initially, disbursements from the loan and the GEF grant would initially be made on the traditional system (reimbursements with full documentation and against Statements of Expenditures (SOE), and direct payments) and would be considered for conversion to the new disbusement based on Project Management Reports (PMRs) after the Financial Management System is operating satisfactory. UEP will then prepare and submit to the Bank quarterly Project Management Reports (PMRs) which enables the linking of expenditures to the Project's financial, physical, and procurement activities and their simultaneous monitoring, while also serving as support for applications for disbursements from the loan account. The basis and format of these reports would be agreed with the Bank and would be in accordance with the Bank's financial management manual and LACI procedures.

UEP applies an integrated financial management system, SIGEF, which would account for project expenditures and monitor processes. As this system is limited to purposes of accounting and tracking expenditures, UEP agreed to establish, as part of SIGEF, a sub-system to monitor the financial and physical activities of the Project including planning, internal controls, contracts monitoring, and financial reporting and controls. The chart of accounts for the Project has been structured accordingly, thus ensuring that project expenditures will be accounted by appropriate components and categories. The project accounting and financial system would gather processes and accounting data so as to produce accurate information. To ensure reliable information, the accounting and financial systems would be linked with other project monitoring systems.

Audits. Annual standard audits of Project and CONAM financial statements will be prepared in accordance with terms of reference acceptable to the Bank, and be furnished to the Bank not later than six months after the close of the Project's financial year (December 31). CONAM has selected an independent and qualified local firm for the audit, in agreement with the Bank. CONAM's financial administrator will work with this firm to carry out interim audits throughout the year, in order to prepare the annual audits within the specified timeframe.

Procurement. UEP will follow the Bank guidelines for the procurement of goods and recruitment of consultants, and will use standard bidding documents for all IBRD-financed procurement. Procurement arrangements and thresholds for procurement methods and prior review are presented in Annex 6. The Project will follow the Procurement Plan (that forms part of the PIP), which will be updated semi-annually and submitted to the Bank for approval. A procurement supervision mission will take place at least once a year, including ex post reviews.

Reporting. UEP will submit to the Bank quarterly progress reports, as well as a more comprehensive annual report (by December 31 of each year). The Borrower shall review the annual report with the Bank, not later than one month after reception. UEP will conduct a mid-term review on or about December 31, 2003, to evaluate implementation progress against set objectives, and will furnish to the Bank at the closing a plan for the future operation of the Project. It will prepare a project Implementation Completion Report, to be submitted to the Bank not later than six months after the closing.

Operations Manual. Project management functions and responsibilities will be governed by the Operations Manual, which covers, *inter alia*, project procedures, financial guidelines, staffing and staff responsibilities, contracts supervision, flow of funds, special account, budgeting, auditing and reporting, as well as procurement and disbursement procedures. CONAM has finalized the Operations Manual to the Bank's satisfaction.

D. Project Rationale

1. Project alternatives considered and reasons for rejection:

Separate Projects. The Bank initially considered two separate follow-up TA projects to PERTAL for electricity and telecommunications, respectively, so that each operation could focus on a particular sector reform agenda, allowing support for reforms in one sector to not be delayed by problems in the other. However, the Government requested that the Bank merge the assistance to these sectors into a single operation, due to the synergy of approaches to similar issues in the two sectors, and the efficiency of project preparation and implementation by both the Bank and CONAM (which is handling reforms in both sectors, and whose UEP would be in charge of Project implementation).

Electricity Privatization. The Bank and the Government considered having the Project assist privatization in the electricity sector as well as in telecommunications. However, because of the ready availability of funds from IDB's Private Provision of Infrastructure Loan, and Government's desire to accelerating the electricity privatization, the Government decided to use IDB funding for this purpose. This activity will be coordinated by CONAM, with close cooperation between the Bank and IDB.

Hydrocarbons. At one point, it was planned to include in the Project reform and enhanced private enterprise participation in hydrocarbons, which forms part of CONAM's mandate. However, the complex economic, social, environmental and political issues associated with that sector reform would have entailed the risk of serious delays in preparing the relevant project components. Given that PERTAL was completed by end-1999, the Government requested that the proposed Loan be processed quickly so that the momentum of the overall reform program not be lost and a hiatus in external financing be avoided. Hydrocarbons was therefore dropped from this project.

GEF Components. The Bank and the Government also decided to include components aimed at removing barriers to expanding rural electrification and to enhancing the efficiency of electricity use. These form part of the Government's sector objectives, and are consistent with GEF global objectives to which the Government has subscribed. Without Bank and GEF support, the Government would not be able to implement such programs in the short term and would most likely wait until the wider sector reforms were consolidated. To enhance effectiveness, it was decided to focus Bank financing on the strategic and institutional requirements, such as preparing relevant legal/regulatory/institutional reforms including strengthening of the rural electrification fund FERUM, and to seek GEF funding for (i) assessment of barriers impeding the efficiency of electricity use and expansion of RET in rural areas, and options and requirements to overcome these barriers, and (ii) follow-on activities such as pilot projects, dissemination campaigns, and activities-specific training.

ICT-based business centers. This component is integral to the Project, providing and receiving support in relation to the Project's policy and institutional measures in the telecommunications sector and its expansion of rural electricity and telecommunications services by helping to generate incremental income in low-income areas which is needed to expand markets for such infrastructure services. ICT-based business

development services, while still experimental for MSBs, have demonstrated their importance to larger firms as tools for increasing competitiveness and reaching new markets. The ongoing Ecuador International Trade and Integration Project was considered as a vehicle for this component, but does not qualified under the project description, orientation (which is exclusively focused on the export market), or implementation schedule (the Project is scheduled to close in June 2002).

Regulatory Structure. Consideration was given to creating a unified regulatory agency for telecommunications and electricity, so as to gain synergies and use scarce expertise more efficiently. However, this would have necessitated amendment of several laws and regulations, as well as the dissolution of existing regulatory and enforcement agencies in both sectors. While there are common elements in price regulation and retail provision of telecommunications and electricity, issues of technical regulation are quite distinct. Therefore, it was decided to support the Government's approach by strengthening the existing agencies in both sectors, with focus on increasing their autonomy and efficiency.

2. Major related projects financed by the Bank and/or other development agencies (completed, ongoing and planned).

Sector Issue	Project	Latest Supervision (PSR) Ratings (Bank-financed projects only)	
		Implementation Progress (IP)	Development Objective (DO)
Bank-financed			
a. Enactment of a new Telecommunications Law, establishment of an autonomous regulatory agency. (conditionality) b. Adoption of efficient tariffs for telecommunications and electricity. (conditionality)	Ecuador - SAL (approved May 2000; first tranche disbursed)	S	S
Technical assistance to reform telecommunications and electricity;	Ecuador - PERTAL (TA) (closed December 1999)	S	S
Privatization of electricity distribution companies (conditionality)	Ecuador - SAL (closed October 1997)	U	S
Enhancement of energy efficiency	- Brazil - Energy Efficiency - Jamaica - Demand Side Management - Mexico - High Efficiency Lighting - China - Energy Conservation	S	S
Promotion of decentralized rural electrification	-Argentina - PERMER -Bolivia - ESMAP Country Program II	S	S
Other development agencies			

Financing of investment bank and other advisors to privatize electricity sector enterprises	Ecuador - Private Provision of Infrastructure TA Loan, IDB (on-going)		
Enhancement of energy efficiency	European Union and USAID financed projects in Ecuador		
Removing barriers to use of windpower (Galápagos pilot)	UNDP/GEF project in Ecuador, implemented in 1997-2000 by MEM/DEA		
Privatization of telecommunications (conditionality)	Ecuador SAL, IDB		

IP/DO Ratings: HS (Highly Satisfactory), S (Satisfactory), U (Unsatisfactory), HU (Highly Unsatisfactory)

3. Lessons learned and reflected in the project design:

Lessons learned from similar projects in Ecuador (particularly the PERTAL project, as reflected in the ICR dated May 10, 2000) and LAC at large are reflected in the project design. These lessons can be summarized as follows:

Power and Telecom Sector reform

- A clear, predictable, and modern legal/regulatory/institutional framework, with autonomous regulatory agencies, arms-length regulation ensuring a level-playing field, liberalized markets with open access, and anti-trust provisions are needed to attract private investment in infrastructure;
- Autonomous, technically competent, and self-financed regulatory and enforcement entities are needed to grant new licenses, resolve disputes among operators, and protect the public interest;
- Newly-created regulatory entities are frequently overwhelmed but have little expertise to draw upon. On-site consultant support and operational advise during the initial phase is invaluable;
- A tariff system based on long-run marginal cost need to be established at the start of the reform process. Subsidies to low-income/low-volume consumers should be well-targeted;
- Appropriate environmental management requires not only the adoption of a coherent set of regulations, but also specific expertise within the regulatory agencies and a strong collaboration with other environmental authorities and with the firms operating in the various activities of the sector.
- Consultations with stakeholders are essential for the success of reforms. These consultations should start at the design stage of the program so as to integrate the stakeholders concerns into the reform policies. The Government should proactively explain its program to specific stakeholders and the public at large, by means of a professionally designed public information campaign.
- The reformed legal/regulatory/institutional framework needs to be constantly monitored and adjusted.

Private Sector Participation

- A well defined, communicated and implemented program of reforms, with broad stakeholder support, needs to precede private sector participation.
- Unbundling of the state-owned monopoly needs to be completed prior to offering the enterprises for sale.
- Private sector participation, as the most visible reform action, requires top-level political support from the executive and legislative branches, as well as a centralized and professional approach.
- The privatization agency needs operational flexibility to make expeditious decisions, while maintaining

a close coordination with other agencies.

Rural infrastructure

- Infrastructure investments in rural areas can yield high economic and social returns, but the financial returns may be too low to attract private firms. Therefore, these schemes often require subsidization and other government financing, which must be carefully analyzed and planned.
- "Universal access" funds have been successful in industrialized and developing countries. A least-subsidy approach has proven effective, providing for a one-time subsidy for capital, rather than for recurrent costs. (In Chile, low, competitively distributed subsidies - not exceeding US$10,000/line - provided considerable leverage to accelerate rural telecommunications development.)
- Complementary sector reforms largely determine the success of rural infrastructure programs. Major risk factors include policy variables (especially interconnection rules and tariffs), in addition to financial and technical aspects.
- Local priorities should guide investments, and strong local participation should be encouraged. Market studies should be undertaken before deciding on a course of action. Flexibility and adaptability need to be designed into projects.
- There is no one best institutional or implementation approach, but strong motivation is essential on the part of the implementing entity, and private participation is key to sustainability.
- Joint planning and/or implementation of rural infrastructure projects in several sectors makes practical and economic sense.

Energy efficiency

- Pricing and regulatory reforms are necessary but not sufficient to maximize and capture energy efficiency potential; key market barriers must also be addressed in a comprehensive and sustainable way.
- The expansion of energy efficiency activities entails a learning process, requiring that firms receive the correct market and regulatory signals over an extended period of time. Because of this, and the need to build collaboration and consensus, a phased approach is desirable. The first phase should demonstrate early successes, while laying the groundwork for more substantial investments. This approach also permits an exit strategy if conditions turn out to be unsatisfactory.
- A longer term, appropriately-funded dissemination and replication strategy is necessary to avoid post-project reduction in efficiency improvement momentum.
- Energy conservation investments provide good to excellent economic rate of returns where energy prices reflect economic costs.

4. Indications of borrower and recipient commitment and ownership:

Successive governments have maintained the commitment to modernize and privatize these sectors, despite setbacks resulting from frequent changes in government and in principal policy makers, and achieved considerable progress under difficult circumstances. With support of the Bank's PERTAL, new laws and attendant regulations and guidelines have established the basis for restructuring the two sectors and preparing them for privatization. However, these efforts need to be completed, especially the enhancement of private participation and further improvements to the sector frameworks. The Government also has shown concern about global climate change, and has initiated modest programs to promote energy efficiency. The Government's commitment to the Project objectives is demonstrated specifically by:

Telecommunications

- The 1992 Law, which separated operations (EMETEL) from regulatory and control functions (SUPTEL);
- The 1995 Law, which created new regulatory and enforcement entities (CONATEL and SENATEL) and allowed privatization of EMETEL, which was segmented into ANDINATEL and PACIFICTEL;
- Official launching of the privatization process of EMETEL in 1996;
- Creation of a sectoral modernization and privatization unit within CONAM (November 1997), and attempts to sell 35% of shares in ANDINATEL and PACIFICTEL (April 1998);
- Tariff rebalancing in December 1996, July 1997, November 1997, and September 1999;
- The March 2000 Economic Transformation Law which eliminated exclusivity and increased the share of ANDINATEL and PACIFICTEL that can be held by the strategic investor(s) from 35% to 51%.
- The renegotiation of ANDINATEL's and PACIFICTEL's concession contracts in April 2001, which resulted in the elimination of the exclusivity clauses.

ICT-based business development services

- Policy agenda adopted by MICIP to upgrade policy environment for ICT through passage of an e-commerce framework law, greater facilitation of ICT goods and services under the trade regime, stronger intellectual property protection for ICT development, and data privacy and consumer protection for e-transactions.
- MICIP leadership commitment to extend the reach of information technologies services to low-income regions of Ecuador and MSBs, and explicitly through proposed ICT-based business development centers.
- Ongoing decentralized cluster competitiveness programs in partnership with MSBs across Ecuador in the areas of textiles and clothing, fishing, ceramics and tourism.
- Commitments of core private sector partners to co-sponsor development of Project's MSB development centers, led by CORPEI, Ecuador's main export association, and by Microsoft with local IT industry partners.
- Cooperation agreements with Camara Industriales, Camara de Industrias de Cuenca and ASOEXPEBLA in Manta to provide local business content, training support, and promotion to ICT-based business development services in their respective areas.

Electricity

- Establishment during 1996-98 of a modern legal/regulatory/institutional framework based on arms-length regulation, competition, and maximum participation by private enterprise.
- Creation of CONELEC for regulation and enforcement and CENACE for least-cost dispatch and administration of the liberalized wholesale market.
- Segmentation of INECEL into separate companies for generation, transmission, and distribution, in March 1999.
- Major tariff increases during November 1998 - October 1999 and since June 2000, raising average electricity prices to over 50% of economic costs and reducing cross-subsidies.
- Elaboration of a "Reglamento Ambiental para Actividades Eléctricas", a presidential decree which completes the environmental legislation and mandates the creation of a separate within CONELEC in charge of overseeing the environmental and social impacts in the sector.
- Elimination of restrictions to private participation in electricity enterprises, through the March and July 2000 Economic Transformation Laws.
- IDB-assisted privatization, aiming to start with distribution companies this year, to be followed by similar offerings of shares in generation companies and the transmission company.

Energy Efficiency and Decentralized Rural Electrification

- Creation within MEM of a Directorate charged with fostering an energy conservation culture and removing barriers to the use of renewable energy, especially in rural areas.
- Through the MEM, the Government beginning to address some of the electricity needs of rural public services such as health clinics, schools and community centers. Some $1.3 million ($1.0 million from Corporación Andina de Fomento -- CAF, and $300,000 from the Government) has recently been made available to install PV systems in public services in remote frontier and Amazonian regions. There is also a Ministry of Defense PV-based rural electrification initiative in the frontier areas near Peru.
- Carrying out of energy efficiency programs with European Union and USAID support.
- MEM's preparation of a public information oriented energy efficiency initiative, for which it is seeking financial support (the GEF Alternative provides partial support for this).
- Endorsement of the proposed Project by the GEF focal point in Ecuador (Ministry of Environment), through a letter dated November 10, 2000.

5. Value added of Bank and Global support in this project:

The Bank's global and regional (e.g., Argentina, Bolivia, Dominican Republic, Mexico, Nicaragua, Peru, Venezuela) experience in reforming the legal/regulatory/institutional frameworks of the infrastructure sectors, and supporting privatization, would provide critical support to the Government's program, and help avoid mistakes in carrying it out. In particular, the Bank would transmit its experience in addressing social and environmental concerns, and promoting public dialogue and understanding of reforms, to design programs that are more responsive to the concerns of key stakeholders, and thus more viable politically. The Bank's ability to promote change in key regulatory areas such as telecommunications interconnection and tariffs would enhance the results of increased competition in the sectors. In addition, the Bank would provide advice on second-generation reform issues, especially anti-trust and refinement of existing regulations and tariff-setting methodologies. The Bank and GEF would also transmit their international experience in removing barriers and developing relevant programs for end-use efficiency of electricity and rural electrification.

The project's ICT-based business development centers build on the ongoing work to support small and micro firms' international competitiveness that is taking place under the Bank financed International Trade and Integration project in Ecuador. It also benefits from the Bank's growing cross-country involvement and collaboration with the IT industry to develop and support of MSB business development service products and delivery systems which shape ICT hardware and software infrastructure to local needs, as well as help foster the development of related local content and skills training to make it pay off. The Bank also brings to the project mobilization of international technical expertise in e-assessments, e-commerce policy analysis and e-government.

E. Summary Project Analysis (Detailed assessments are in the project file, see Annex 8)

1. Economic (see Annex 4):

○ Cost benefit NPV=US$ million; ERR = % (see Annex 4)
● Cost effectiveness
○ Incremental Cost
○ Other (specify)

More effective regulation, institutional modernization, and increased private participation will enhance the efficiency of telecommunications and electricity services, resulting in higher output and more productive

employment economy-wide, and increased government revenues from sector enterprises. However, sustained efforts are needed to achieve these results and to avoid backtracking of reforms. The economic impact of the new frameworks - in terms of efficiency improvements, increased investment, expansion of service, and higher revenues - can be more fully evaluated only after several years.

Telecommunications

Leveraging rural investments with broader sectorial reform will yield significant returns over the longer term. The subsidies which may be required in support of rural programs are likely to be small relative to the benefits. Increased access to international telecommunications will reduce transaction costs for international trade and open up new export opportunities. Advanced information technology also has wide-ranging applications for improving health and education services, and will become more affordable over time.

Electricity

Ensuring adequate electricity supplies will protect economic recovery and long term growth. Pilots in rural areas that bundle energy and telecommunications services will help reduce costs while demonstrating how to use infrastructure to improve health, education and business opportunities. The impact of tariff adjustments on (i) the cost of living and production costs in the economy, and (ii) future electricity demand and capacity requirements, is being evaluated, supported by PPF 360-EC. The impact of the development of a competitive wholesale market also needs careful monitoring.

GEF Energy Efficiency and Decentralized Rural Electrification

A cost-benefit analysis has been carried out for components that would receive GEF cofinancing. For the energy efficiency component, full implementation is estimated to result in Net Present Values's (NPV) ranging from $42.8 million in the base case to $186.7 million in the high case. For rural electrification, as no reliable market information is available yet, we have instead determined the required payment, approximately US$0.28/kWh, which is necessary for full life-cycle cost recovery (excluding the GEF capital contribution). The tables below summarize the results of the GEF incremental cost analysis - see Annex 4a for details:

Incremental Costs and Benefits Matrix - Energy Efficiency

	Baseline	**Alternative**	**Increment**
Global Environmental Benefit		Barriers reduced or eliminated Reduced CO_2 emissions compared with forecast Creation of sustainable EE programs in private sector (end users) , distribution utilities and ESCOs.	Reduced or eliminated barriers Reduced CO_2 emissions (2,154,260 tons by 10th year). Additional viable EE measures which can be replicated in region
Costs	US$250,000	US$7,186,000	US$6,936,000

GOE financing **WB financing** **GEF financing** **Private financing**	US$250,000		US$210,000 US$508,000 US$1,226,000 US$4,992,000

Incremental Costs and Benefits Matrix - Rural Electrification with RET

	Baseline	**Alternative**	**Increment**
Global Environmental Benefit		Barriers reduced or eliminated Reduced CO_2 emissions compared with forecast Creation of sustainable RE with renewable energy	Reduced or eliminated barriers Reduced CO_2 emissions (192,400 tons) cumulatively at project end
Costs	US$2,236,000	US$5,917,000	US$3,681,000
GOE financing **WB financing** **GEF financing**	US$715,000		US$300,000 US$1,768,000 US$1,613,000

2. Financial (see Annex 4 and Annex 5):
NPV=US$ million; FRR = % (see Annex 4)

The appropriate financial conditions to attract strategic investors, especially the base prices for privatization of power sector companies and for the tendering of spectrum licenses, need to be proposed by the financial advisors retained by CONAM. In addition, the following sector-specific issues need to be addressed:

Telecommunications

Tariff rebalancing : The tariff policy needs to give predictability to future unit revenues. To better reflect actual costs and thereby encourage competition in local services, CONATEL increased tariffs for monthly line rentals and local calls in September 1999. Further, based on a study financed by the Project, CONATEL approved Resolution 456 of October 5, 2000 to finish tariff re-balancing through a series of semi-annual adjustments in local and long distance tariffs to conclude in December 2002.

Electricity

Assets and liabilities of the sector enterprises need to be clearly defined prior to offering these enterprises to private investors. This task is being undertaken by the privatization advisors.

The impact of the program of gradual tariff increases - in terms of strengthening sector finances and reducing the US$300 million subsidies to consumption - need to be evaluated in detail.

Fiscal Impact:

The Project would have a positive impact on central government finances, due to: (i) incremental tax revenues from the privatized and additional private sector enterprises; and (ii) a reduction in subsidies in line with the move toward cost-covering tariffs. This impact would be permanent and would far more than compensate for the cost of the Project. Administrative expenditures of the regulatory, enforcement, and market management entities would be covered by charges on sector enterprises. There would also be a large one-time revenue boost from the privatization sales themselves.

3. Technical:

Private investors will tend to bring leading technologies and modern management and operational techniques. The Project will finance the acquisition of hardware and software, including monitoring and measuring equipment, for CONELEC and CENACE; technical consultants have identified the required items. SUPTEL will also receive equipment to help monitor the telecommunications sector; consultants will be hired to define the technical specifications for this equipment during early project implementation. For the rural telecommunication and energy components, market demand studies will provide the information needed to determine the location and technology parameters for bidders. Bidding documents will contain technical as well as coverage specifications, although some flexibility will be left to the winning bidders. The business centers will require modest amounts of computer hardware; software design will be based upon feedback from focus groups and discussions with MSB, suppliers, buyers and software design specialists. Cost estimates for consulting services, studies, training, and other technical assistance activities are based on experience. Allowances for physical and price contingencies are in line with those generally applied in Ecuador.

4. Institutional:

CONAM and the participating agencies have the necessary capacity and experience to carry out the project, including project monitoring and evaluation. The UEP is fully staffed, including a project coordinator, several sector consultants, a financial director, disbursement staff and a procurement specialist. Nevertheless, the project will strengthen CONAM's procurement and disbursement capacity. While the regulatory agencies are relatively well-functioning, their longer-term autonomy, competence, and financial viability need to be ensured through appropriate policies, proper application of laws and regulations, and clear procedures. To strengthen the public sector's new role in telecommunications and electricity, the managerial and professional staff of the relevant agencies will receive formal training as well as visit other countries undertaking similar reforms and initiatives. The project will test and evaluate innovative organizational and financing mechanisms for energy efficiency and rural RET schemes.

4.1 Executing agencies:

CONAM is the project's executing agency; in charge of procurement and disbursement, project coordination and oversight of sector reform and modernization. It will work closely with the participating sectorial agencies that have direct implementation responsibilities for their respective components.

4.2 Project management:

CONAM's UEP will be responsible for this Project's coordination and financial administration (procurement; disbursement; accounting). UEP will have authority to decide on technical matters related to the project, while CONAM's management will limit itself to policy decisions. UEP is supported by a team of competent specialists in telecommunications, electricity, privatization, tariffs, public information, project economic analysis, and financial administration, who have wide-ranging experience in their respective

fields as well as in liaising with other government entities and international financial institutions. The Project management component will provide resources for key advisors to UEP and for technical assistance to the sector agencies. An important aspect of project supervision will be to ensure that adequate counterpart funds are made available and that competent project management continues.

In telecommunications, the project will support the strengthening of SUPTEL's supervisory functions and will assist CONATEL in the design and implementation of pilot project for the extension of telecommunications services to rural and marginal urban areas. Suitable conditions for CONATEL's preparation and administration of the pilot project will be established early in the Project. In the electricity sector, CONELEC's and CENACE's respective responsibilities and functions have been adequately established as part of the sector framework, but the agencies need to improve coordination in some areas (e.g. preparation of the indicative sector development program). Coordination between MEM and CONELEC with regard to rural electrification, environmental management and energy efficiency will be developed while designing the 10 years National Electrification Strategy supported by the Project. The sector agencies also need to improve their consultation arrangements with the sector enterprises. These requirements will be addressed early in the Project.

4.3 Procurement issues:

A preliminary review of procurement aspects was conducted in December 2000, regarding CONAM's organization and staff, legal aspects, procurement procedures and environment. An action plan was agreed with CONAM to address the gaps and deficiencies that were identified. A detailed procurement assessment was finalized during the appraisal mission. During negotiations, the final Operations Manual with detailed responsibilities and procedures for efficient coordination and collaboration between CONAM and participating agencies was submitted to and approved by the Bank, as well as the procurement plan for the duration of project implementation, with a detailed plan for the first year. Main pending actions agreed upon with CONAM include: a/ Continue procurement training for CONAM's and other implementing agencies' staff, in particular during the project launch workshop; b/ Publish the project's General Procurement Notice, immediately after loan approval; c/ Open a section on the project in CONAM's web page; d/ Start the creation of a consultants and suppliers data base for the project to input contracts and follow up actions; e/ Establish a computerized system for the monitoring and filing of contracts in CONAM (condition of effectiveness). CONATEL's procurement procedures for the recruitment of rural telecommunications private operators were reviewed and agreed upon during the appraisal mission. Special provisions are included in the Loan Agreement to address inconsistencies between national procurement laws and regulations and World Bank's procurement guidelines.

4.4 Financial management issues:

A review of CONAM's procedures and organization for the project financial management was conducted in October 2000 and updated during the appraisal mission. An action plan to address deficiencies was agreed with CONAM and has been satisfactorily implemented. In particular, a system to monitor the financial and physical activities of the project has been designed and an independent auditor has been selected.

5. Environmental: Environmental Category: B (Partial Assessment)

5.1 Summarize the steps undertaken for environmental assessment and EMP preparation (including consultation and disclosure) and the significant issues and their treatment emerging from this analysis.

After market studies identify the geographic areas and technologies for rural telephony and electricity pilots, environmental experts would review the studies; if negative environmental impacts are anticipated, an environmental assessment, following World Bank Guidelines, would be carried out. The bidding documents that invite private operators to supply and operate such systems, and the subsequent contracts,

would require that the recommendations of the environmental assessment be applied. Environmental guidelines will be incorporated into the design and operational manuals of FODETEL and FERUM.

Sector reforms that promote private investments could lead indirectly to potentially adverse environmental impacts. Environmental management requires specific environmental regulations, guidelines, and norms covering investments, operations (including closure of operations), as well as strict monitoring and enforcement of compliance. An environmental assessment of activities in the telecommunications and electricity sector, was completed prior to appraisal. It reviewed the existing environmental legislation, procedures and practices in Ecuador as well as the environmental impact studies that were completed for 16 of the 20 companies in the electricity sector. The assessment concluded that while the overall legal framework is satisfactory and reflects a coherent environmental policy, implementation is lagging. It also concluded that the rules for environmental impact assessment for enterprises operating in the electricity sector provide sound general guidelines, but that these were inefficient due to the absence of specific environmental regulations and needed to be complemented with more detailed guidelines to undertake EIAs in all stages of the sector activities. The main factors explaining low levels of compliance are: (i) the lack of specific environmental regulations and procedures to implement environmental laws, (ii) the weak institutional capacity of the regulatory agencies (CONATEL and CONELEC); even though CONELEC has the necessary expertise in this field it lacks a consistent approach to environmental issues, and (iii) the absence of instruments and detailed guidelines to assess the environmental impact of projects and to monitor compliance. Furthermore, community participation in the different stages of the EIA has been scant due in part to the absence of a promotion campaign and the lack of established participation mechanisms. Insufficient public information together with a lack of economic incentives and credible enforcement mechanisms explain the limited interest to adopt more energy efficient practices among firms and households.

The environmental assessment also identified the key policy actions needed to modernize and strengthen relevant environmental/social regulations and guidelines and assist sector regulators to build up their capacity to address environmental issues. These recommendations, detailed in annex 11, constitute the core of the environmental subcomponents of the Project. Specifically, to improve environmental management of the power sector, the Project will include technical assistance to (i) prepare environmental regulations for electricity operations, norms and guidelines for their applications, (ii) strengthen institutional capacity to address environmental issues through the creation of an environmental unit within CONELEC, training programs for CONAM, CONELEC and staff from the Ministry of Environment and sector operators, and assistance to operators to improve environmental management within the firms; and (iii) develop information and monitoring systems to facilitate the design and enforcement of environmental policies.

In preparation for the privatization of the distribution companies, a preliminary environmental assessment of the companies in the sector was completed in a study commissioned by CONAM and financed by the IADB. However, the information gathered is insufficient to prepare an environmental baseline, especially for the case of distribution companies. To remedy this gap, private investors will be expected to undertake during their first year of operation formal environmental audits to assess the stock of environmental liabilities accumulated prior to the privatization and discuss the results of the audits with the Government. Environment liabilities as identified through these audits are expected to be financed by the Government, except if otherwise specified in the privatization bidding documents. Government funds would have to be allocated for that purpose, as privatization proceeds can only be used by the Solidarity Fund for social investments.

5.2 What are the main features of the EMP and are they adequate?

N/A

5.3 For Category A and B projects, timeline and status of EA:
Date of receipt of final draft: May 21, 2001

5.4 How have stakeholders been consulted at the stage of (a) environmental screening and (b) draft EA report on the environmental impacts and proposed environment management plan? Describe mechanisms of consultation that were used and which groups were consulted?

Project preparation missions have met in the field with representatives of indigenous populations, and the principal environmental NGOs (local and international), explaining the project objectives and plans. CONELEC and CONATEL are governed by norms that define procedures for public audiences and include the questionnaires to survey those who would be affected by new investments.

5.5 What mechanisms have been established to monitor and evaluate the impact of the project on the environment? Do the indicators reflect the objectives and results of the EMP?

The Bank will carry out formal communications and consultations with the stakeholders on environmental issues related to the Project. During the project launch workshop, the dialogue with stakeholders will be broadened, inviting their comments on the relevant aspects of project implementation and seeking ways to involve them in project monitoring and evaluation.

6. Social:

6.1 Summarize key social issues relevant to the project objectives, and specify the project's social development outcomes.

The Project supports reforms and policy actions aimed to improve the delivery of electricity and telecommunications services to the Ecuadorian population. These reforms include an increased private participation in the sectors, the adoption of laws and regulation to protect the various stakeholders and especially consumers, and the design and implementation of specific programs to extend these and other related services to marginal urban and rural communities.
While these reforms will bring benefits for all the Ecuadorian through a more efficient service delivery and a broader national coverage, they may also have an adverse impact on some vulnerable groups in the society. The Government is committed to protecting these groups, and adopting the necessary measures to mitigate the adverse impacts of the reforms. The optimal approaches to delivery of telecommunications and electricity services to rural populations, including the use of subsidies, will be addressed in the market studies. However, it must be noted that in the telecommunication tariff rebalancing plan approved by CONATEL in November 2000, there is a category with low telephone tariffs for consumers located in rural and marginal urban areas. While privatization in the power sectors may produce some short-term redundancies, experience shows that liberalizing the sectors soon results in substantial net increases in employment.

Both sectors have legal requirements for consultation with consumers. For telecommunications, these involve public hearings, announced in the press, before and after the authorization of concessions. CONATEL also holds other open meetings at which it discusses technical, administrative and tariff aspects, and its web page (www.conatel.gov.ec) provides information on sector laws, regulations and resolutions. (However, these public meetings have generally had a greater attendance from Government than from civil society.) In electricity, since 1998 the regulations themselves have been the subject of public hearings, prior to issuance. CONELEC also maintains a complaints book, and its annual report includes users' assessment of service quality. Since 2000, the environmental regulations also incorporate public hearings with consumers

In Ecuador, the most part of the indigenous population is located in rural areas. Indigenous communities will benefit from the expansion of services and the positive environmental impact of using renewable sources of energy, but the program in rural areas may also have some adverse social impact on these communities. Under the leadership of the Bank's civil society specialist in Quito, the project has prepared during appraisal an Indigenous People Development Framework to identify the indigenous communities affected by the program, determine the social impact of the program in these communities and examine the safeguards to prevent or mitigate that impact. It will consult with the indigenous beneficiaries, inform them on the progress realized in the design and implementation of the project and of the accompanying social safeguards. The consultations will be consistent with the Operational Guideline 4.20 of the Bank and the guidelines included in the Ecuadorian legislation, which recognizes indigenous' rights to guard their culture and traditions, and their rights to previous consultations.

6.2 Participatory Approach: How are key stakeholders participating in the project?

Key stakeholders include: (a) state enterprises to be privatized and potential investors; (b) inhabitants of rural areas to receive telephony and electricity services; (c) MSB to receive training and access to ICT services in the pilot business centers; (d) large consumers of energy, who might be targeted by the energy efficiency component; (e) labor unions, and (f) Civil Society Organizations, including NGOs. Some labor unions and NGOs are opposed to sector reform and privatization; they should be engaged in the public consultation and information process. CONAM has briefed principal stakeholders on project objectives and scope.

The Project will finance the design and implementation of a public information strategy for CONAM. The dialogue with stakeholders will be continued during the Project launch workshop and Project implementation. Stakeholders in the process of privatization of the electricity distribution companies, including local governments, workers, firms' management, and communities, were also consulted during the design of the privatization strategy. Interviews in TV, radio and press were given to inform the public on the objectives of the Government's strategy for the sector. More recently, CONAM has organized several meetings with the workers in the sector, to explain in detail: (i) the Government privatization strategy; (ii) the options for workers to acquire shares into the companies and the financing schemes that will facilitate their participation; and (iii) the results of the Road show that took place in March 2001.

Market studies for the design of the rural electrification and telecommunications components of the project will involve substantial consultation with the relevant rural communities. Additional consultations will take place under the leadership of the Bank's civil society specialist in Quito. Consultations with indigenous communities will build up on the wide participatory process undertaken at a national level under the Bank's on-going Prodepine project. Interviews, focus groups and workshops will take into account the specific cultural and linguistic characteristics of these groups, using methodologies that will ensure their inclusion into the process. The design of a strategy to ensure access to information to the different stakeholders will also take into account the specificity of the indigenous context.

The detailed design of the ICT-based business development centers is being carried out with the participation of potential microbusinesses in several ways. The cluster development programs under the Ecuador International Trade and Integration Project have already tapped local business and community involvement in producing competitiveness analyses which identify constraints to growth and strategic plans to provide direction for new sector development. Focus groups are being conducted in each of the five areas sited for the centers to get first-hand assessments of business process problems which can be addressed by ICT-based solutions. Local business associations, such as the Camara de Industrias de Cuenca and the ASOEXPEBLA in Manta will be working to organize and help prepare local content and business skills training programs to be utilized by the centers.

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6.3 How does the project involve consultations or collaboration with NGOs or other civil society organizations?

While some consultations have already taken place, World Bank experts and consultants on participation and public information techniques will advise CONAM and other parties on appropriate mechanisms, target groups, content and timing of greater consultations. This will form part of a public information and consultation strategy to be finalized prior to loan effectiveness.

Participatory methods to be used during the consultation are intended to strengthen inclusion and facilitate the achievement of the various stakeholders' objectives. These consultations were initiated during the preparation of the project and will continue during its implementation.

6.4 What institutional arrangements have been provided to ensure the project achieves its social development outcomes?

CONAM will be responsible for the implementation of the consultations and participation component, and of addressing social impacts of the project. CONAM will establish relationship and exchanges with the World Bank Prodepine project to analyze accumulated experiences on investment infrastructures. It will also benefit from the Prodepine project by learning from the participating methodologies already applied in indigenous community planning, and from the input that the latter project would provide regarding the requirements for capacity building in these communities.

6.5 How will the project monitor performance in terms of social development outcomes?

A monitoring and evaluation component is included in the project. In the case of the rural telephony and electricity component, the market study can serve as a baseline--to be compared with the results of a second survey to be conducted at project completion. The project would contract existing Ecuadorian institutions to monitor social development progress. Performance will be assessed through evaluations that will present the opinions and perceptions of beneficiaries. These evaluations will be performed during project implementation, with a periodicity yet to be defined, and will provide useful feedback to optimize the results of the project.

7. Safeguard Policies:

7.1 Do any of the following safeguard policies apply to the project?

Policy	Applicability
Environmental Assessment (OP 4.01, BP 4.01, GP 4.01)	● Yes ○ No
Natural habitats (OP 4.04, BP 4.04, GP 4.04)	○ Yes ● No
Forestry (OP 4.36, GP 4.36)	○ Yes ● No
Pest Management (OP 4.09)	○ Yes ● No
Cultural Property (OPN 11.03)	○ Yes ● No
Indigenous Peoples (OD 4.20)	● Yes ○ No
Involuntary Resettlement (OD 4.30)	○ Yes ● No
Safety of Dams (OP 4.37, BP 4.37)	○ Yes ● No
Projects in International Waters (OP 7.50, BP 7.50, GP 7.50)	○ Yes ● No
Projects in Disputed Areas (OP 7.60, BP 7.60, GP 7.60)	○ Yes ● No

7.2 Describe provisions made by the project to ensure compliance with applicable safeguard policies.

The Project is expected to lead to increased activity by private telecommunications and electricity providers throughout the country, which could have environmental and social impacts. However, the strengthened legal/regulatory/institutional framework as result of the Project would provide social and environmental

safeguards and adequate participation by stakeholders in decision making and mitigation of these impacts. The Project would, in consultation with stakeholders, (i) finance the preparation of relevant regulations, guidelines, and norms; (ii) strengthen the capacity of the regulators in the two sectors to address environmental and social issues; (iii) ensure that appropriate dispositions are including in bidding and concession documents to address assessment and mitigation of environmental and social impacts of future projects in both sectors; and (iv) give high priority during project supervision to compliance with safeguard policies.

F. Sustainability and Risks

1. Sustainability:

The Project would strengthen the legal/regulatory/institutional framework and the regulatory agencies, and enhance private participation in the telecommunications and electricity sectors. Results from these efforts ought to be sustainable, provided the underlying policies are maintained and the regulatory institutions retain the necessary autonomy and resources to adequately exercise their functions. Crucial in this respect is that the regulatory agencies continue to be financed directly from fees charged to sector enterprises, rather than from the general budget.

The Project's public information campaign should increase appreciation of the benefits of reform. Linking overall reform with the expansion of services to rural areas should also serve to build support for the reform process, as would better targeting of subsidies to those in need. The energy efficiency component, by partially offsetting tariff increases, should also contribute to the overall sustainability of reforms.

The energy efficiency component itself should be sustainable, especially once ESCOs are established and consumers begin to appreciate the savings possible. Similarly, the rural electrification component should develop the interest of private investors to install and maintain isolated systems. Furthermore, experience in other countries indicates that once modern electricity is installed in rural areas, if properly managed and maintained, demand grows. A continuation of Government commitment to the process--backed by the support of rural stakeholders--combined with financing to FERUM from regulated enterprises, should ensure that the process is sustainable. The option of a dedicated financial mechanism for decentralized rural electrification will be reviewed during project implementation and the corresponding regulations and institutional framework will be developed or strengthened. Public sector entities benefiting from decentralized energy systems will have to allocate sufficient funds for system O&M by private operators. These financial sustainability issues were discussed with the Government and relevant entities during the project appraisal mission. The emergence of local private equipment supply and maintenance companies, and the use of these new electricity and telephony services in community centers, businesses, schools and health clinics, will be an indication of sustainability.

In the case of energy efficiency and decentralized rural electrification, sustainability will hinge on replicability of demonstration projects in a scale sufficient to attract interest from private operators and further improve financial viability of corresponding activities. Key factors to facilitate project replication include the establishment or strengthening of appropriate policies, regulations and incentives, market conditions, financing mechanisms and institutional capacity. These aspects were discussed during the project appraisal mission.

An important goal of the ICT-based business development centers is to attain financial sustainability through appropriate service pricing and maximum cost efficiency. In this regard, it would aim to achieve

overall financial break-even by year 3 of operations, an internal rate of return comparable to market expectations by year 5, and to meet tax obligations from its inception. At the same time, the component represents a pilot initiative due to a number of particular risks, which revolve around the design innovations anticipated in ICT-based products and delivery, the rate of acceptance of the microbusiness market, which has very limited purchasing power and often lacks any tradition of using business development services, and the need for strong cost efficiency of a decentralized system. While the Bank loan would help buffer these risks by covering the costs particularly of the transfer of technology and skills, client promotion, technical assistance, quality assurance and evaluation, strict attention will be paid to fine-tuning products and delivery systems according to microbusiness client reactions and to ensuring the coverage via users revenues of the direct costs of product delivery as the fundamental means of promoting long-term sustainability.

2. Critical Risks (reflecting the failure of critical assumptions found in the fourth column of Annex 1):

Risk	Risk Rating	Risk Mitigation Measure
From Outputs to Objective		
Continued instability of Ecuador's macroeconomic (especially fiscal) and financial positions; policy reversals; delays in enacting the revised legal, regulatory and institutional framework	S	Policy coordination between Government and IFIs to overcome fiscal and financial sector weaknesses; Assistance through qualified consultants in: (i) preparing government initiatives; (ii) communication and consultations with Congress and principal stakeholders; (iii) public information campaign. IMF/Bank (SAL) conditions regarding telecommunications and power sectors. Promote reforms through regulations to existing legislation
Weakened commitment of the Government to approve and implement regulations ensuring the financing of FODETEL for rural telephony and FERUM for decentralized rural electrification	M	Support for preparation of necessary regulations, based on market surveys and appropriate participation and consultation of beneficiaries.
Solidarity Fund assumes interventionist stance vis-a-vis enterprises, thus sidelining sector agencies and constraining enterprise management;	M	Ensure government consensus on, and assistance in, strengthening the sector frameworks prior to privatization; ensure autonomy of sector agencies and enterprise management
Potential investors not interested in acquiring/providing electricity services in rural areas and internet and business service centers in peri-urban areas.	S	Design transactions to make rural concessions and business centers attractive. Consult extensively with potential investors and users to determine interest.

Strengthening of sector regulatory and enforcement agencies not attained due to lack of appropriate instruments and qualified staff (especially at mid-levels) and insufficient commitment of regulatory agencies.	M	Continuous dialogue with Government on need for strong and autonomous agencies; continuation of policy that finances regulatory agencies through fees imposed on sector firms. Project to give management and staff development at sector institutions high priority. Agreement on institutional development plans for regulatory agencies.
Government commitment to tariff adjustments weakens; full economic cost proves to be politically unattainable, thus impacting privatization.	S	Make continued tariff adjustments priority topic of project/sector/CAS dialogue and of public information campaign; provide support for better targeting of subsidies.
Public opposition to privatization of electricity sector.	S	Communication and consultations with groups opposing changes; preparation and implementation of remedial measures (lifeline tariffs; stock options for workers, etc.). Public awareness of electricity expansion plans and link to sector reform.
Government does not succeed in privatizing a significant part of the power sector	M	Above mitigation measures concerning tariff adjustment, public opposition, regulatory agencies and macroeconomic framework. Adequate privatization strategy with support of qualified investment bank.
From Components to Outputs		
Inadequate quality of preparatory and other technical outputs.	N	Bank's non-objections are needed for consultancies' TORs and acceptance of reports.
Insufficient capacity to implement project	M	Project to support CONAM and sector implementing agencies under the loan.
Lack of timely availability of counterpart funds to finance the project.	H	Project will agree with the Government on a disbursement schedule for both loan and counterpart funds to ensure timely financing of the components.
Inadequate coordination between CONAM and implementing entities	M	Clear allocation of responsibilities between CONAM and agencies, as spelled out in PIP
Communication and Consultation component poorly executed or used for purposes outside project scope	M	Bank no objection to terms of reference and award of contract; careful supervision and review of materials prior to diffusion.
Overall Risk Rating	H	

Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N(Negligible or Low Risk)

3. Possible Controversial Aspects:

Telecommunications and Electricity

Risk	Type of Risk	Risk Rating	Risk Minimization Measure
Lack of political and social acceptance of principles of the Government's sector reform programs and of the implementation strategies	S; G; M	S	Consultations with stakeholders; public relations campaigns designed to stress benefits of reform and privatization measures

Type of Risk – S (Social), E (Ecological), P (Pollution), G (Governance), M (Management capacity), O (Other); Risk Rating - H (High Risk), S (Substantial Risk), M (Modest Risk), N (Negligible or Low Risk)

G. Main Loan Conditions

1. Effectiveness Conditions

(i) MEF and CONAM have entered into a subsidiary agreement under terms and conditions satisfactory to the World Bank, to provide the transfer to CONAM of the proceeds of the Loan and the counterpart funds required for the implementation of the project.

(ii) CONAM has furnished evidence of the completion of the procurement strengthening action plan, including establishment of a computerized system to follow up on procurement and execution of contracts to the satisfaction of the Bank.

(iii) CONELEC's Environment Management Unit has been created and the Decree for Environment Regulation of Power Sector Activities has been enacted.

(iv) Strategy for the implementation of the Consultation and Communication Component of the project has been finalized to the Bank's satisfaction.

2. Other [classify according to covenant types used in the Legal Agreements.]

Conditions of Board Presentation

(i) Nomination of a representative to the Statutory Committee

(ii) Endorsement of the GEF component of the Project by the GEF's CEO

Covenants

(i) CONAM and the implementing agencies (CONATEL/FODETEL, SUPTEL, CONELEC, CENACE, MICIP and MEM/DEREE) will enter into implementation arrangements setting forth the contribution of these agencies to project implementation and the conditions for transfer of equipment financed under the project to these agencies.

H. Readiness for Implementation

☒ 1. a) The engineering design documents for the first year's activities are complete and ready for the start of project implementation.
☐ 1. b) Not applicable.

☐ 2. The procurement documents for the first year's activities are complete and ready for the start of project implementation.
☒ 3. The Project Implementation Plan has been appraised and found to be realistic and of satisfactory quality.
☒ 4. The following items are lacking and are discussed under loan conditions (Section G):

- Documents mentioned under conditions of effectiveness.
- TOR for consulting services to be contracted during the first year of project implementation.

I. Compliance with Bank Policies

☒ 1. This project complies with all applicable Bank policies.
☐ 2. The following exceptions to Bank policies are recommended for approval. The project complies with all other applicable Bank policies.

Philippe J. Durand	Danny M. Leipziger	Isabel M. Guerrero
Team Leader	**Sector Manager/Director**	**Country Manager/Director**

Annex 1: Project Design Summary

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Sector-related CAS Goal:	**Sector Indicators:**	**Sector/ country reports:**	**(from Goal to Bank Mission)**
1. Restore macro-financial stability and accelerate economic growth, through, *inter* alia, an enhanced private sector role	1.1. Evidence of wider access to, and enhanced efficiency and quality of, telecommunications, electricity and internet access and business services with increased participation of private providers. (See annex 1a for detailed indicators).	CONATEL, CONELEC and ODEPLAN statistics. ITU and OLADE statistics.	Continued government commitment to market-oriented reforms and to efficient private sector participation. Private investors willing to invest in the telecommunications and electricity sectors. Successful privatization of power sector companies (under IDB-financed project). Private investors willing to invest in business centers facilities and in the development of ICT- based services for MSB in Ecuador.
2. Setting the basis for poverty reduction and human development.	2.1. Increased living standards and broadened opportunities for the poor in the communities receiving, through the pilot projects, access to telecommunications, electricity and internet and business services	CONATEL and CONELEC statistics. SIISE information system for social indicators Rural demand studies and surveys.	Private sector interest in expanding access.
GEF Operational Program:			
3. Support sustainable development and productivity by the poor. .	3.1. Improved environmental management through use of renewable energy technologies (RET) in rural areas and promotion of efficient end-use of electricity.	Market and consumer surveys.	Private sector/consumers interest. Consumers' sufficient affordability and willingness to pay for decentralized systems

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Project Development Objective: The project would assist the Government in its efforts to deepen reforms in the telecommunications and electricity sectors, by supporting: (1) the development of sound legal & regulatory frameworks and efficient regulatory institutions to foster competition and increased private participation in the sectors, (2) the extension of electricity, telephony and ICT-based business services to low income groups on a pilot basis, (3) the implementation of programs to promote efficient use of electricity, and (4) the development of appropriate public consultation and information mechanisms.	**Outcome / Impact Indicators:** ***1. Legal, regulatory and institutional development*** 1.1. Improved effectiveness of the Superintendencia de Telecomunicaciones (SUPTEL) to supervise the sector and undertake timely public consultations and dissemination of regulatory decisions. (See annex 1a for specific indicators). 1.2. Improved effectiveness of the regulatory agency, CONELEC, to regulate the sector and undertake timely public consultations and disseminations of regulatory decisions. (See annex 1a). 1.3. Completed environmental regulations and procedures in the electricity sector; strengthened the capacity of CONELEC, CONAM and other institutions including sector operators, to promote a better environmental management of sector activities. 1.4. Establishment of liberalized wholesale electricity market, as shown by a greater number of private operators in the power grid, larger volume of transactions in the WEM, and a more efficient administration of the wholesale market by CENACE. 1.5. Number of private operators providing rural telecommunications, decentralized rural electrification, energy efficiency services and ICT-based services to MSB. 1.6. Selected studies and support activities in the telecommunications and electricity sectors.	**Project reports:** Project progress reports Independent assessment (consultant's report). SUPTEL's and CONATEL's reports and statistics. Project progress reports Independent assessment (consultant's report). Government's official resolutions CONELEC's, CONAM's, and MEM's reports and statistics. Project progress reports Independent assessment (consultant's report). CENACE's reports	**(from Objective to Goal)** Continued government commitment to sector reforms and increased participation of private firms in the sectors. CONATEL, SENATEL and SUPTEL committed to fulfill their mandate and abide by the rules established in the new legal and regulatory framework. CONELEC and MEM committed to fulfill their mandate and abide by the rules established in the new legal and regulatory framework. Commitment of the Government to implement and maintain pro-competitive laws and regulations. CENACE committed to fulfill its mandate and abide by the rules established in the new legal and regulatory framework. Successful privatization of power sector companies (under IDB-financed project).

	2. Extension of telecommunications, electricity and ICT-based business services to low income groups		
	2.1. Adoption of a sustainable strategy to extend telecommunications and electricity services to the poor, including the adoption of cost efficient financing and delivery mechanisms.	Government's official resolutions	Commitment of the Government to aplication of laws, regulations and contracts (i) ensuring the financing of FODETEL, FERUM and other financing mechanisms for off grid electrification; and (ii)specifying rights and obligations of private and public operators related to Universal Service in the two sectors.
	2.2. Successful completion of pilot projects for rural telecommunications, testing the cost- efficiency, subsidy optimization, service quality, effective community participation and replicability of the models adopted by the Government. (See annex 1a).	Surveys of a representative sample of project clients compared with a baseline control group to be established during the project. CONAM and CONATEL monthly and bi-annual progress reports.	Effective CONAM- sector institutions-other stakeholder cooperation
	2.3. Successful completion of pilot projects for renewable-energy based decentralized electrification, testing several delivery mechanisms and conditions for sustainability and replicability.	Evaluation of a sample of pilot projects CONAM, CONELEC and MEM monthly and bi-annual progress reports.	System designs able to reach smaller firms and beyond urban areas. Active participation of clients in the design and use of the project.
	2.4. Successful completion of the pilot project for ICT-based business development services to MSB in urban and peri-urban areas, showing evidence of changes in MSB' conduct, market outreach and competitiveness leading to incremental direct and indirect value added and employment, and showing replicability of the delivery and financing models adopted by the government. (see annex 1a).	Periodical surveys of a representative sample of project clients compared with a baseline control group to be established during the project. CONAM and MICIP monthly and bi-annual progress reports.	

	3. Increase in use-efficiency use and conservation of electricity 3.1. Successful implementation of a program to enhance efficiency in the use and conservation of energy. 3.2. Successful implementation of demonstration projects testing cost- efficiency, service quality, effective community participation and replicability of the programs adopted by the Government. (See annex 1a). ***4. Implementation of effective public consultations and information mechanism*** 4.1. Adoption of sector reforms that balance appropriately various stakeholders' interests, and include effective enforcement and dispute resolution mechanisms. 4.2 Public consensus around the Government's modernization and privatization program.	Measurements of energy consumption in a representative sample of project clients compared with a baseline control group to be established during the project Surveys and opinion polls	Establishment of incentives and regulations to foster efficient use and conservation of electricity. Consumers will utilize efficient electricity systems and appliances Private energy services companies (ESCOs) will emerge. Effective CONAM- sector regulator-other stakeholder cooperation
GEF Global Development Objective Mitigation of climate change through reduction of greenhouse gas emissions, achieved by removing barriers to the use of (i) RET to extend electricity supply in rural areas (GEF Operational Program No.5) and (ii) energy-efficiency measures (GEF Operational Program No.6).	**Outcome/Impact Indicators** 1. Actual tons of CO_2 reduced through (i) the implementation of pilot project based on renewable energy technologies in rural areas; and (ii) the implementation of a program to enhance end-use energy efficiency (see annex 1a). 2. Estimated tons of CO_2 that should be reduced through the implementation of subsequent investments resulting from the project activities, over the next five or ten years.	**Project Reports** Measurement of energy consumption in pilot project and in a baseline control group. Calculations and survey-based projections for consumers targeted for decentralized electrification and end-use energy efficiency.	**(From Objective to Goal)** Establishment of incentives for private development of renewable energy and energy efficiency investments. Consumers will afford and utilize renewable energy technologies and energy-efficient systems and appliances. Several private energy services companies (ESCOs) and private providers of decentralized rural electrification will be operating.

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Output from each Component: **1. Modernization of legal, regulatory, and institutional sector frameworks** *Telecommunications*. ● Strengthening of SUPTEL	**Output Indicators:** 1.1.Action plan to strengthen SUPTEL regulatory capacity prepared and implemented, including : (a) procedures manual and staffing plan; (b) management and staff training program, and (c) purchase of equipment and soft- ware programs (See annex 1a). 1.2. Tariff rebalancing plan prepared and implemented by all operators.	**Project reports:** Monitoring by CONAM, SUPTEL, and the Bank (bi-annual supervision missions)	**(from Outputs to Objective)** Full support by Government and other stakeholders to project implementation and underlying sector reforms, as demonstrated by: ● Timely implementation of the new legal/regulatory regime. ● Sector institutions receive adequate financial resources and managerial autonomy to carry out their function. Financial and human resources committed on continuous basis to these tasks.

Electricity			
● Definition and implementation of regulations and procedures for sector operation and expansion. ● Strengthening of CONELEC ● Improvement of the sector's environmental management ● Strengthening of CENACE and establishment of a liberalized electricity wholesale market.	1.3. Existing legislations updated to facilitate the operation and growth of a competitive, private sector led electricity sector. Additional regulations prepared, including those detailed below. (See annex 1a).	Monitoring by CONAM, CONELEC and the Bank (bi-annual supervision missions)	Full support by Government and other stakeholders to project implementation and underlying sector reforms, as demonstrated by: ● Enactment of legislative changes by Congress ● New legal, regulatory, institutional framework is fully applied and maintained, especially autonomy of regulator and of sector enterprises ● Sector institutions receive adequate resources to carry out their functions
	1.4. Tariff adjustment plan prepared by CONELEC to progressively achieve economic cost recovery. (See annex 1a).		
	1.5. Anti- Monopolyc regulations prepared and adopted to promote effective competition and prevent monopolistic abuse in generation, transmission and distribution activities.		
	1.6. Measures to improve environmental management in the sector adopted and implemented including: (i) environmental regulations, norms and guidelines for electricity operations; (ii) creation of an environmental unit within CONELEC, (iii) training programs for CONAM, CONE-LEC, Ministry of Environment and sector operators, and (iv) development of information and monitoring systems.	Monitoring by CONAM, CONELEC, MEM and the Bank (bi-annual supervision missions) Monitoring by CONAM, CONELEC and the Bank (bi-annual supervision missions)	
	1.7. Action plan to strengthen CONELEC prepared and implemented, including : (a) procedures manual and staffing plan; (b) management and staff training program, and (c) purchase of equipment and software programs (See annex 1a).		
	1.8. Improve administration of the wholesale electric market (MEM) by CENACE through the : (a) application of rules for MEM's operation; b) acquisition of necessary equipment and software; and (c) training in application of modern wholesale market management techniques. (See annex 1a).	Reports from CONELEC and CENACE.	New regulations to promote competition and prevent monopolistic abuses are implemented.

2. Extension of services to low income groups in rural and peri-urban areas			
• Pilot projects to provide telecommunications, internet access, and distance education services to rural and peri urban areas.	2.1. 166 telecenters that will include in average 10 PCs, 3 telephones and a virtual classroom for 20 students. The centers will be installed in small, medium and large towns during 2001-2004 by private companies under concessions/contracts through a competitive bidding for the least subsidy.	Rules and TORs for the interested bidders Other bidding documents	Strong commitments of Government Institutions to design, implement and monitor the activities. Significant interest among private providers. Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.
• Design and implementation of a sustainable strategy for rural electrification with private sector participation and promotion of RETs.	2.2. Electrification Program defined for the next 10 years by CONELEC and MEM for rural and peri-urban electrification (on-grid and off grid) with private sector participation and promo- tion of RETS adopted and implemented. Sustainable financing and delivery mecha nisms, especially for off grid electrification program, adopted and implemented. Specific projects identified and evaluated. 2.3. Market barriers to utilization of RETs reduced, through capacity building, public information campaign, market surveys and definition of standards for RETs equipment and installations.	CONELEC's and MEM's reports Rules for granting concessions and other contracts. Action plan for rural electrification projects over 10 years. Market surveys.	Strong commitments of Government Institutions to design, implement and monitor the activities. Significant interest among private providers. Willingness of consumers to use RETs. Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.

• Pilot projects to provide electricity services to off-grid rural areas, and promote the use of RETs, with the option of a joint bid to also provide telecommunication services.	2.4. Pilot project for off grid electrification designed and implemented under 2 modalities: ---*Serving Rural dispersed population:* Contracts granted for concessions or concession-like agreements through competitive bidding for the least subsidy, and option for joint provision of telecom services in at least one contract to install SHS for lighting and communications in about 2,220 households PV systems, 220 wind electric systems and 100 pico-hydro installations. ---*Public Sector Infrastructure Projects:* Contracts granted for concessions or concession-like agreements through competitive bidding for the least subsidy, to provide energy supply for public services (schools, health clinic, community centers) including at least 80 rural schools.	Rules and TORs for the interested bidders Other bidding documents	Strong commitments of Government Institutions to design, implement and monitor the activities. Significant interest among private providers and willingness of consumers to use RETs. Active involvement of targeted communities in monitoring of performance by suppliers and payments by the users.
• Pilot projects to provide, computer and internet access and ICT-based business services to micro and small business in peri-urban and large rural communities	2.5. Assessment of key regulations affecting e-commerce (electronic signature, privacy issues,etc..) presented to the Government. 2.6. One hub and 4 community ICT-based BDS centers designed and implemented by 12/31/02 in peri-urban areas, and 3 BDS centers in peri-urban areas and 1 BDS center in rural areas launched by 12/31/03 offering: (i) ICT applications adapted for local MSB; (ii) software with local con- tent to fit needs of local busines- ses; (iii)computer-training courses and (iv) internet access at least for the BS in peri-urban areas.	Consultant's report endorsed by relevant authorities (MICIP, CONAM). Business plans of the centers. CONAM monthly and bi-annual progress reports	Government committed to promote of IT and IT related activities to promote growth and enhance competitiveness. Effective coordination between CONAM, MICPI. (ministry of industry and commerce) and relevant NGOS. Strong interests of the business community in the pilot sites to participate.

●3. Design and implementation of a program to promote efficient use and conservation of electricity ● Reduction in barriers to efficiency enhancement, through (a) electricity tariff adjustments, (b) issuance of related standards and norms, and labeling of electrical appliances. ● Dissemination of best practices for rational use of electricity. ● Support to the development of ESCOs. ● Implementation of demonstration projects	3.1.Standards and norms for efficient energy use and conservation are issued, and electrical appliances are appropriately labeled. 3.2. Information campaign undertaken on best practices for rational use of electricity. 3.3. Increased in the number of successful ESCOs, private providers of efficient energy equipment. 3.4. Demonstration projects successfully implemented.	Surveys of impacts on electricity consumers CONAM monthly and bi-annual progress reports Bi-annual supervision report	Strong commitment of CONAM, DEA and other sector institutions well to design implement and monitor the activities. Significant interest among public, commercial and industrial users to participate. Significant interest among private providers ESCOS.
4. Effective Project Communication, Coordination and Management ● Stakeholder participation in the design of the reform program ● Broad public dissemination of the content and impact of sector reform programs. ● Increased transparency in sector regulation ● Additional Support to Sector Reforms provided as needed ● Effective project management and coordination	4.1. Public consultations on proposed reforms in electricity and telecommunications implemented, including the: (a) organization of workshops and focus groups to identify concerns; and (b) design and implementation of channels for stakeholders to further express their views.. 4.2. Public media campaign on the content and impact of sector reforms designed, opinion researches completed and outreach activities launched. 4.3. Action plan and staff training program adopted and implemented for strengthening CONATEL, SUPTEL and CONELEC's capacity to undertake timely public consultations, and systematically disseminate regulatory decisions and procedures. 4.4. Timely implementation of the Project.	Project progress reports Project progress reports Project progress reports Consultant's document Government Official Plan Project progress reports	Full government commitment to openness and dialogue with civil society Effective CONAM- sector agencies cooperation in the design and implementation of the campaign. Full government commitment to openness and dialogue with civil society. Effective CONAM- sector agencies cooperation in the design and implementation of the campaign. Effective cooperation between CONAM and sector agencies. Effective CONAM- sector agencies cooperation in the preparation and implementation of the project.

Hierarchy of Objectives	Key Performance Indicators	Monitoring & Evaluation	Critical Assumptions
Project Components / Sub-components:	**Inputs: (budget for each component)** (US$'000) (Total Cost w/contingencies and taxes)	**Project reports:**	**(from Components to Outputs)**
1. Modernization of legal, regulatory, and institutional sector frameworks	12,802		
a) SUPTEL institutional strengthening	1,166	CONAM; SUPTEL, CONELEC; consultants	Adequate quality of preparation and analysis by competent specialists
b) Technical Assistance and Equipment for CONELEC	1,885		
c)Technical assistance for improving environmental management to CONELEC, Environment Ministry, CONAM and operators	1,055	Project progress reports CENACE reports	
d) Equipment and TA to CENACE to supervise and manage the MEM	7,956		
e) Preparatory studies	740		
2. Extension of services to low income groups in rural and peri-urban areas	13,816		
Telecommunications a) Preparation, implementation and evaluation of pilot projects.	6,972	FODETEL activity reports PROMEC supervision reports and mid-term review	Satisfactory activity preparation and implementation by CONAM, and CONATEL.
Rural Electrification (GEF) a) Assistance to MEM and CONELEC	1,874	CONELEC MEM activity reports Project supervision reports and mid-term review	
b) Preparation, implementation and evaluation of pilot projects.	2,081		Satisfactory activity preparation and implementation by CONAM, DEA, and other sector entities
ICT- based business services a) E-readiness assessment (review of regulations and IT inventory), business plan and TA	2,890 933	CONAM and MICIP activity reports Project supervision reports and mid-term review	Satisfactory activity preparation and implementation by CONAM, MICIP, and other sector entities
b) Preparation, implementation and evaluation of pilot project.	1,957		

3. Design and implementation of a program to promote efficient use and conservation of electricity (GEF)	7,113		Satisfactory activity preparation and implementation by CONAM, MEM, and other sector entities
a) Removing barriers to energy efficiency development	1,970		
b) Demonstration projects	5,142	Project supervision reports and mid-term review	
4.4. Effective Project Communication, Coordination and Management	8,984		Satisfactory activity preparation and implementation by consultants and CONAM
		CONAM(UEP) monthly and semi-annual activity reports	Further strengthening of CONAM (UEP) project coordination team
a) General project coordination, supervision and monitoring by CONAM.	5,207	Project progress reports	
b) Supervision and monitoring by SUPTEL, CONELEC, MEM, CONATEL/FODETEL and MICIP.	1,400	Periodical surveys	Capacity building for project implementation
c) Communications and consultations strategy	2,377		Adequate quality of preparatory and other technical outputs. Satisfactory survey/report preparation and follow up by consultants and CONAM, and sector entities.

Annex 1a.

Core Indicators of Project Outcome/Impacts (1)

Objective	Performance Indicators	Year End						Document
		Base-line (2000)	**2001**	**2002**	**2003**	**2004**	**2005**	
1. MODERNIZATION OF LEGAL, REGULATORY AND INSTITUTIONAL DEVELOPMENT								
1.1 TELECOMMUNICATIONS								
• Improved effectiveness of supervisory agency SUPTEL	• Number of thousand subscribers per SUPTEL employee	**8.77**	8.8	9.0	10.0	12.0	14.0	C, H
1.2 ELECTRICITY								
• Improved effectiveness of regulatory agency, CONELEC	• Aggregate timeliness of CONELEC in completing selected regulatory tasks as established in its procedures (%).	**(to be defined in CONELEC's Strategic Plan in Sep/2001)**						H, I
• Efficient administration of the wholesale market administrator, CENACE	• Timely presentation of transaction settling and billing information (hours)	8 (August 2000)	8	8	8	6	6	K, H
2. EXTENSION OF SERVICES TO LOW INCOME GROUPS IN RURAL AND PERI-URBAN AREAS								
• Positive impact of pilot projects for rural telephony and electricity	• Traffic in project-financed telecenters (minutes/day)	0	0	0	12mn	24mn	32mn	B, E, N. G, H
	• Number of electrified households in pilot project areas	0	0	0	800	2220	2220	
• Positive impact of pilot projects for ICT-based services micro and small businesses (MSBs).	• Cumulative number of MSBs that have used business services	**(to be defined in MicroNet business plan in Jan/2002)**						N, M, G, H
3. INCREASED END-USE ENERGY EFFICIENCY								
• Positive impact of demonstration projects	• Reduction in energy consumption of users participating in the pilot projects. GWh thousand BBLF	**0** **0**	0 0	0 0	6.6 4.7	18.9 26.1	38.3 57.6	N, G, H
GEF GLOBAL DEVELOPMENT OBJECTIVE								

• Mitigation of climate change through reduction of greenhouse gas emissions.	• Actual thousand tons of CO2 reduced through the implementation of demonstration projects (renewable energy-based rural electrification and end-use energy efficiency).	**0**	0	0	14.1	47.6	80.0	N, G, H

Note (1): The Project Implementation Plan (PIP) contains detailed indicators that will be used by CONAM and the Bank to monitor the electricity and telecommunications sectors, the outcome and outputs of the project and the implementation of project components.

Sources of Information

B: CONATEL Annual Reports
C: SUPTEL Annual Reports
E: Rural Demand Studies
G: Project progress reports
H: Independent Assessment (consultants' report)
I: CONELEC Reports.
K: CENACE Annual Reports.
M: MICIP Reports.
N: Periodic surveys of representative samples compared with a baseline control group

Annex 2: Detailed Project Description

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

(The cost items include 15% physical and price contingencies and taxes.)

By Component:

Project Component 1 - US$12.80 million

Strengthening of legal, regulatory and institutional frameworks in the telecommunications and electricity sectors. Cost US$12,802; Loan financing US$10,287,000

a. Strengthening of SUPTEL's supervisory/enforcement capacity: Cost US$1,166,000; Loan financing US$1,000,000;

This component includes, inter alia:

- Technical Assistance to design a quality of service control system for telecommunication, Radio and TV operators, design a new organization structure and procedures to improve the efficiency of SUPTEL, design a radio frequency spectrum monitoring and management system, and improvement of SUPTEL internal communication and information systems.
- Training of SUPTEL staff in modern telecommunications regulation, dispute resolution, management and monitoring of the radio frequency spectrum, new technologies, and management.
- Systems and equipment for operators' quality of service control, radio frequency management and monitoring, and internal information and communication.

b. Strengthening of CONELEC's regulatory capacity: Cost US$1,885,000; Loan financing US$1,885,000

The following activities are included:

- Two advisers for specialized advise over the four years of the project
- Refinement of regulations and preparation of new regulations, including on third-party access to transmission and distribution, anti-monopoly, guarantees of existing contracts and exports and imports of electricity
- Studies and Consultancies on regulatory and tariff issues
- Databases and information systems
- Software models, including GIS system
- Training
- Assistance for supervision and evaluation of the wholesale electric market
- Assistance for supervision and evaluation of Quality of Service
- Measuring equipment

c. Improving environmental management in the electricity sector with assistance to CONELEC and other relevant institutions Cost US$1,055,000; Loan financing US$1,055,000

This component comprises:

- Assistance to strengthen the various institutions involved in the environmental management of the power sector, i.e. mainly CONELEC, but also the Ministry of Environment, CONAM and sector operators. Main actions include: (a) establish a Environmental Management Directorate (EMD) within CONELEC and provide necessary training and equipment to the EMD; (b) establish a

inter-institutional environmental network to serve as a forum for the various institutions cited above to discuss environmental issues; and (c) support the creation of environmental units within the sector companies to facilitate compliance with environmental guidelines and promote efficient use of energy;

- Assistance to CONELEC to complete and implement environmental regulations: The main objective will be to prepare and implement a Manual of Procedures that will accompany the *Reglamento ambiental para actividades eléctricas.* Discussions with focus groups will take place during the preparation of the manual, and three workshop will be organized in Quito, Guayaquil and Cuenca to present and disseminate the Reglamento and the Manual;
- Provide training to improve environmental management to the various institutions cited above;
- Assistance to develop and implement information and monitoring systems: (a) environment quality network to gather information on air quality, acid rain, quality of water, and other environmental parameters; and
- Assistance to develop database of economic and technical information on alternative sources of energy to facilitate the design and implementation of generation projects using renewable sources of energy.

d. Improving wholesale market administration by CENACE: Cost US$7,956,000; Loan financing US$6,187,000;

To support the proper functioning of the liberalized electricity wholesale market, through assistance in the elaboration and applications of rules for its operation, the financing of relevant studies, and the partial financing of the necessary equipment and software, including:

- Development of a short-term planning model that will provide information on system reliability, cost of dispatch, and maintenance scheduling, in order to improve load dispatch programming, ensure system security and reliability, and enhance quality of supplies.
- Development of a medium and long term planning model to forecast hydrology of the system and creation of database on hydroclimatology. This information would also be used by CONELEC for its own medium-term system planning, and by prospective investors to decide on plant extensions.
- Set-up of a system for the settlement of commercial transactions in the wholesale market, which will allow the determination and evaluation of transactions, i.e., physical amounts of electricity traded, evaluation and closure of spot market transactions, charges to system operators for services rendered, and financial settlements (for energy and capacity) between distribution companies and generation/transmission companies.
- Development of an integrated commercial measurement system**,** which will allow (i) remote control of information submitted by generating companies, distributors and large-volume consumers and (ii) centralized verification and processing of this information, required to assess transactions (energy and capacity) carried out by the wholesale market operators. The component would include the acquisition of a limited amount of measuring and registration equipment.
- Upgrading of information systems that support CENACE's technical and commercial functions and provide CONELEC and the operators with information on the functioning of the different market segments.
- Developing a network architecture. This activity includes the acquisition of firewall, switch and proxy servers as well as the design of a internet platform.
- Implement System Integration. This activity includes the purchase of hardware and software to undertake the integration of the different systems used in the administration of the WEM.
- Acquisition of hardware and software for improving the real-time operation of the interconnected system. Existing sub-systems (for data acquisition, operator-equipment interface, and maintenance) were designed in the early 1990s and require updating. This entails acquisition and testing of new equipment and programs.

e. Preparatory and general studies; Cost US$740,000; Loan financing US$740,000

This will finance the realization of several studies and consultancies including:

- Tariff rebalancing study for telecommunications for the determination of the economic (long-run marginal) costs, by groups of service. On the basis of economic costs and financial requirements of service providers, standard tariffs for principal groups of services will be developed; a re-balancing plan to establish tariffs at their economic cost for each service group will be designed and corresponding tariff policies will be formulated.
- Completion of studies on wholesale market administration to update and improve systems for transactional circuit development, measurement of commercial operations, and preparation and exchange of information for operators.
- Studies to analyse the impact of electricity costs in the evolutions of prices in the economy, and the assessment of the energy contribution of the Mazar Project.

Project Component 2 - US$13.82 million

Extension of telecommunications, electricity and ICT-based business services to low income groups in rural and peri-urban areas. Cost US$13,816,000; Loan financing US$7,347,000

a. Pilot projects to be financed through FODETEL-Cost US$6,972,000 Loan financing US$4,420,000;

This component will provide subsidies to operators, through a international competitive bidding process who offer the minimum subsidy to install and operate rural public centers that provide telephone and telecenter (PC) services, like computer services, internet access, distance video and audio conference facilities used for distance education, fax, printing, file transfer, etc. FODETEL is carrying out the Demand Study, that will determine the exact size of the Centers, its location and the number of PCs per center. Preliminary studies show that the Project will finance the installation of about 166 Centers, that include on the average 5 or more PCs, 1 or more public telephones, and some will have a virtual classroom for 20 students. In Annex 4 we calculated that the total cost of a telecenter, on average, will be about $40,000, of which $25,000 will be the subsidy, based on an average usage of 45 hours per day per center (for example 9 hours per PC per day for 5 PCs). The operators will commit to operate them for 10 years, to keep them open a certain number of hours per day with adequate staffing to provide services through them to the community. CONATEL will replenish the Fund (FODETEL) through the contribution of 1% of revenues from telephone operators. Operators will obtain 10 year concessions, renewable, to operate telecommunication services throughout Ecuador. Operators will be selected competitively as in BOO contracts and will be free to use their own procurement procedures for installing the telecenters (section 3.13 of the Guidelines for Procurement under IBRD Loans).

There will be three types of Telecenters in this Pilot Project, designed for small (less than 10,000 inh), medium (between 10,000 and 20,000) and large (20,000 and more) towns, and their final design will be tailored to demand. The investment cost will vary with the size between US$30,000 and US$50,000 or more per center. The demand study will determine the size of each center.

Preparation of the above component will be carried out by CONATEL, and will include, inter alia the following activities:

Demand study (US$100,000)
Preparation of tender document and carrying out the auction (US$20,000)
Promoting the use of the centers in the community (US$50,000)
Training local staff in charge of the telecenters (US$50,000)
Supervision and monitoring (US$50,000)

CONATEL will also supervise the implementation of the Project, and that the Telecenters are kept open the specified number of hours a day, and that the services that the Operator committed to provide in the contract with CONATEL will actually be given. The video conference facilities in the telecenters will be used to provide education and training for teachers, students and habitants to improve the quality of education in the rural areas in the area of influence of the telecenters. CONATEL will coordinate with government institutions, universities, polytechnic institutes, association of teachers, associations of parents, and other public and private organizations to deliver the tele-education program. This activity will include the motivation courses for the teacher leaders and school superintendents, in the areas of influence of the telecenters.

b. Development of a rural electrification plan and program implementation support: Cost US$1,874,000; Loan financing US$381,000; GEF financing US$1,150,000

This sub-component primarily funded through GEF, includes the following activities:

This activity is designed to: (i) provide a sound national plan and strategy for both grid and off-grid rural electrification developed with participation of the principal stakeholders; (ii) ensure development of an effective legal, regulatory and institutional framework; (iii) provide technical, financial and promotional support to pursue this strategy and mitigate key constraints; and (iv) develop a variety of implementation mechanisms and approaches to lay the basis for a sustainable electricity expansion program. The activity will support market analysis and provide implementation support for both pilot projects and other off-grid electrification initiatives, support overall rural electrification program promotion and capacity development, and provide specialized support to ensure the effectiveness of renewable energy-based electricity supply.

Specific components comprise (see detailed description in Annex 4a):

- Design and implementation of a plan and strategy for rural electrification over the next 10 years by CONELEC, with support of MEM and stakeholders; identification and evaluation of rural electrification projects (grid-extension and off-grid) through a market survey complemented with cost analysis.
- Identification of institutional, technical, financial and other barriers to extending electricity supplies, and development of options for their mitigation. These options would include such items as: (i) strengthening promotional and technical capacity for off-grid electrification planning and implementation; (ii) development of alternative implementing schemes including electric utility and non-utility concessions approaches, community and NGO projects and development project linkages, including for example, rural telephony, water supply and social services; (iii) definition of appropriate standards for RET equipment and installation, and training of local support personnel; (iv) public information and training of management and operational staff, including staff from the power sector regulator CONELEC, on best practices, related technologies, and off-grid project preparation and implementation; and (v) monitoring and evaluation of the entire program and of the off-grid pilot projects.

c. Pilot Projects for decentralized off-grid electrification Cost US$2,081,000; Loan financing US$1,387,000; GEF financing US$463,000

Demonstration projects are funded in this component along with specialized services required for implementation, including review and selection of final projects, negotiation of agreements with

implementers, project-specific training, and hardware acquisition and installation. The pilots are designed to demonstrate sustainable as well as replicable institutional mechanisms for project financial administration and project O&M, to demonstrate sound technical performance and reliability, to meet consumers expectations, and to provide socio-economic benefits to end users (see detailed description in Annex 4a).

(1) Rural Dispersed Population -- "Sub-Concession" Pilot. $1,687,000 This pilot will consist of a number of site specific demonstration projects in different areas designed to test the feasibility and effectiveness of a moderate sized rural "concession" or concession-like approach, for planning, installation, maintenance, financial administration and local replication/expansion, of primarily household off-grid electrification systems. Typically the projects are expected to involve dispersed PV, wind or small-hydro installations, including potentially mini-grids, serving public service, household and productive end uses in medium to high potential zones. Potential installations would include 2,850 household PV, wind electric and micro-hydro installations.

(2) Public Sector Infrastructure Pilot. Cost $394,000 This pilot project will demonstrate the sustainability and technical viability of dispersed (off-grid) electrification in areas with lower socio-economic capacity. Support will involve energy supply for public services, for example – in health clinics, schools, community centers and for telecommunications, as well as in very small home lighting systems. Selected community or ethnics organizations, NGOs or other development organizations, RET suppliers or project developers, electric utilities, or other representing communities may be implementing entities. Installations are expected to involve dispersed PV, and/or wind or small-hydro installations, including potentially mini-grids, serving public services including school, health clinics, community centers, and telephone centers, and potentially some productive uses.

The Project will directly finance installations in about 100 schools, community centers and/or health centers, and coordinate with selected telecenter development in villages and towns of the north and south border areas, the Amazon and other zones (some 40 planned in telecom component of project). The pilot will be coordinated with, and provide technical support to the Ministry of Energy and Mines social service electrification project. The MEM project is supported by the Corporacion Andina de Fomento (CAF) with US$1.9 million for off-grid renewable energy-based electrification, including US$900,000 allocated for micro-hydro schemes.

d. Pilot projects to develop business centers for MSB in peri-urban and large rural communities: Cost US$2,890,000; Loan financing US$1,158,000; Private Sector financing US$1,198,000.

This component will assist the MICIP to develop a program to bring IT and ICT based business services to MSB, and to design and implement a series of pilot projects that will test the impact of these services on low-income entrepreneurs. The Project will also assist the Government in developing ICT policies that would facilitate internet exchanges and transactions, and are key to create a favorable environment to the development of e-business. The following activities will also be undertaken under the Project to help strengthen the ICT policy environment and undertake the pilot projects:

- Complete an E-readiness assessment, to provide the framework for the design and implementation of the program, including: (i) an overview of regulations affecting internet provision and use, and the identification of major barriers to internet and e-commerce development with recommendations for specific actions in regulatory and policy areas; and (ii) an inventory of the existing IT infrastructure and businesses (access, prices, web-sites, ISPs etc.).
- Assess against international best practices and make recommendations as needed regarding a law

to improve the legal framework for conducting e-business, which will: (i) give electronic signatures and electronic messages the same legal status as hand-written ones; (ii) define the obligations of the institutions providing electronic certification and other services related to digital signatures; (iii) regulate electronic contracts and consumer protection; and (iv) define responsibilities for electronic fraud. ("De Comercio Electronico, Firmas Electronicas y Mensajes de Datos", Draft Law, 2001).

- Assess policy and promotion options in light of international experience and make recommendations as needed in the area of data privacy and consumer protection, there are as elsewhere concerns which tend to hinder the growth in e-business and e-government.
- Review international practices in such areas and prepare recommendations as needed with regard to (i) development of technological parks; (ii) elimination of taxes on the imports of hardware and software; (iii) provision of incentives to international internet service providers entering the Ecuador market; and (iv) provision of fiscal incentives for the introduction of new technologies.
- Design and implement Business development centers (BDS) for MSB in two phases. The first phase will consist of one hub and 3 community ICT-based BDS designed and implemented by 12/31/02, two in peri-urban areas and one in rural areas; and the second phase of another 4 BDS in peri-urban areas and 1 BDS in rural areas launched by 12/31/03. These BDS will offer: (i) packages such as phone/fax/mail; (ii) ICT applications adapted for local MSB; (iii) software with local content to fit needs of local businesses; (iv) computer-training courses for community members to foster the use of facilities; (v) internet access at least for the BDS in peri-urban areas; and (vi) training in management and production techniques.

Project Component 3 - US$ 7.11 million

Enhancement of electricity end-use efficiency: Cost US$7,114,000; Loan financing US$508,000; GEF financing US$1,226,000; Private Financing US$ 4,992,000.

This activity, funded through GEF Grant and Bank together with substantial private sector financial participation, seeks to (i) establish the technical and financial mechanisms needed to promote the efficient electricity end-use generally, and energy use and environmentally friendly practices in industry; (ii) remove legal, regulatory and/or institutional barriers to efficiency enhancement and create related incentives; and (iii) through local capacity development, lay the basis for a sustainable and economy-wide energy conservation and efficiency program. Specific components include:

Review of legal, regulatory and institutional barriers to efficiency, as well as technical, manpower and financial constraints. Consideration will be given to such issues as tax treatment of efficiency investments, import and tariff treatment of equipment and instrumentation and overall availability of both equipment and technical services, adequacy of financing and utility incentives for support of energy efficiency.

Development of incentives and financing options. The project will assess a variety of incentive options including innovative electricity tariff design and other approaches to support efficiency, as well as evaluating the terms, conditions, general availability and cost of financing for efficiency investment. Among the financing initiatives for efficiency activities to be considered will be a potential levy on utility bills (e.g. 1%) to support investments.

Market Studies. Market surveys and load studies will be supported to identify and quantify opportunities, and assist in design of remedial efforts.

Cost-Benefit Analyses. The project will support cost/benefit analyses of efficiency investments and assist in incorporating these considerations into utility regulatory policy, distribution utility incentives, and into indicative least-cost generation planning.

Efficiency Training, Technical Assistance and ESCO Support. Assistance will be provided for stakeholder involvement, as well as improving government policy and promotion capacity.

Technical assistance and training will be directed toward major private sector end users and technical professionals in industry, commerce and electric utilities. In addition, the project will support the energy service industry (ESCOs), including through development of improved technical capacity, effective ESCO-type contracts and agreements, and interaction with potential international partners.

Information, Motivation and Standards and Norms. A complement to other project initiatives will be efforts to improve end use equipment purchase and replacement decisions. This includes including labeling to inform consumers of the life-cycle cost of new equipment (e.g. for air conditioners, refrigerators, lighting and motors) and encouraging upgrading the efficiency of products available in the local market through cooperative activities with local manufacturers or importers.

Demonstration of Replicable Opportunities: A number of pilot projects will be undertaken oriented toward showcasing replicable opportunities, including: (i) ESCO and/or private utility cooperative programs for lighting improvement in the residential sector, and multi-end use energy efficiency in commerce/government buildings; (ii) public-private joint venture for improved municipal street lighting; and (iii) "strategic partnership" program with industrial and commercial organizations to support energy and environmental improvements (e.g. waste reduction, resource recovery, etc.).

Monitoring and evaluation of the entire program and main demonstration projects.

Project Component 4 - US$8.98 million

Project communication, coordination and management. Cost US $ 8,984,000; Loan financing US4,858,000

a. CONAM project coordination and monitoring : Cost US$5,207,000; Loan financing US$2,932,000

CONAM's Public Enterprise Unit has contracted 11 local specialists, including for telecommunications, electricity, private enterprise development, utility pricing, and financial administration, to coordinate project implementation by the sector entities, as well as supervise various consultancies for which the sector entities do not yet have the required analytical capabilities. CONAM will also manage project procurement, administration, disbursement, accounting and reporting. The Project will finance these consultants, to provide legal, economic and technical advice and carry out necessary financial and administrative procedures. This component will fund local transportation, expenses for office space, equipment and supplies. The project will also finance the project audits.

b. Project management by SUPTEL, FODETEL, CONELEC, MEM-DEA, and MICIP. Cost US$1,400,000; Loan financing US$0

The different entitities in charge of implementing the various components will designate staff to manage the execution of their respective project components, in particular for the drafting of terms of reference, the orientation and support to consulting firms and the review and implementation of measures, regulations, policies and projects as defined by the studies.

c. Communication and consultation campaign for CONAM, SUPTEL and CONELEC: Cost US$2,377,000; Loan financing US$1,916,000

This will provide assistance, by national and international specialists, to CONAM in carrying out a communications process with stakeholders and relevant civil society organizations on the Government's

aims and policies in regard to the reform and privatization program. Specific targets are to: (i) communicate with stakeholders on the importance, requirements, and implications of the Government's program, through eliciting their concerns and fostering their appreciation of the benefits of reforms; (ii) build consensus around reforms among the population at large; (iii) develop communications capacity among institutions instrumental to reforms, including through systematic feedback on the public's perceptions on reforms; (iv) design internal communications mechanisms directed at staffs of enterprises slated for privatization; (v) improve media understanding of reform and privatization issues; and (vi) improve perceptions by international investors about Ecuador. Results will allow CONAM and the Government at large to better assess concerns by the affected populations and consequent requirements for policy modifications, and thus, provide feedback for policy decisions.

The component would be undertaken in three phases, i.e., through (i) immediate action to prepare a communications strategy and implementation plan, including public opinion research; (ii) launching outreach activities, putting public information actions on a strategic footing, and strengthening CONAM's communications capacity (until mid-2002); and (iii) follow-on actions to put the activity on a permanent and sustainable basis (after mid-2002).

The component will also support SUPTEL's and CONELEC's in their effort to undertake (a) timely and inclusive public consultations on major regulatory decisions, through focus groups, public hearings and web-site discussions, and (b) systematic dissemination of sector programs (i.e. rural telephony programs), regulatory decisions and procedures through newspapers and website.

People’s participation is critical to achieve the objectives of the Project. As indigenous populations are key actors, it is necessary to program participatory activities and specific studies from the design phase up to the end of the evaluations, as well as in the implementation and supervision of the Project. To comply with the latter, workshops, focus groups and interviews will be organised in order to achieve the following:

i) define a strategy for consultation by the implementing agencies in each of the Project components, with special emphasis on those, which by definition will benefit the indigenous communities;

ii) integrate and reinforce the mechanisms of consultation already in place to promote inclusion of indigenous populations, such as public hearings;

iii) take into account experiences from previous consultation in the two sectors that could provide feedback for the Project implementation. The analysis will need to identify the existing barriers that prevent indigenous access to the services, and direct the intervention, taking into account their cultural context. The existing barriers and the mechanisms to overcome them will be examined in the context of the communication strategy of the Project; and

iv) provide resources and specialized assistance during Project implementation to ensure efficient provision of services, that maximises the impact of the benefits from the Project by increasing opportunities to generate income in these communities.

Annex 3: Estimated Project Costs

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Project Cost By Component	Local US $million	Foreign US $million	Total US $million
1 - Legal/Regulatory/Institutional Framework	1.52	9.69	11.21
2 - Service extension in rural and peri-urban areas	7.28	5.54	12.82
3 - Enhancement of energy efficiency	4.65	1.74	6.39
4 - Project Communications, Coordination and Management	6.39	1.36	7.75
Total Baseline Cost	19.84	18.33	38.17
Physical Contingencies	0.91	0.70	1.61
Price Contingencies	1.83	1.40	3.23
Total Project Costs	22.58	20.43	43.01
Front-end fee		0.23	0.23
Total Financing Required	22.58	20.66	43.24

Project Cost By Category	Local US $million	Foreign US $million	Total US $million
Goods	15.05	9.35	24.40
Works	0.00	0.00	0.00
Services	7.03	10.03	17.06
Training	0.22	1.06	1.28
Operational Costs	0.28	0.00	0.28
Total Project Costs	22.58	20.44	43.02
Front-end fee		0.23	0.23
Total Financing Required	22.58	20.67	43.25

[1] Identifiable taxes and duties are 0 (US$m) and the total project cost, net of taxes, is 40.41 (US$m). Therefore, the project cost sharing ratio is 56.92% of total project cost net of taxes.

Annex 4: Cost Effectiveness Analysis Summary

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Summary of benefits and costs:

As result of the Government's program to modernize and privatize the telecommunications and electricity sectors, supported by this Project, the economy at large will benefit from improved and expanded access to a wider range of modern telecommunications and electricity services, increased efficiency, and improved quality of delivery. Opening up these sectors to private investment would stimulate private enterprise in other infrastructure sectors as well, leading to enhanced efficiency and transparency in the provision of these services. In addition, strengthening the regulatory entities and promoting competition in the sectors will benefit customers through improvements in quality of service and reduction of its cost.

Electricity

1. Completing the legal and regulatory framework and strengthening the capacity of CONELEC

A sound and complete legal and regulatory framework in the electricity sector and a capable and autonomous regulator (CONELEC) are essential elements for the success of the Government's strategy to open the sector to private investment and to promote competition. The Project will assist CONELEC in completing and updating sector regulations, and will finance technical assistance, training, and acquisitions of equipment and software that will allow the regulator to dispose of a wider range of regulatory tools, to have more accurate information on the sector and develop a stronger regulatory capacity. (The Project's assistance to CONELEC and MEM to define and implement a Plan for Rural Electrification is discussed later in annex 4a). The benefits of providing assistance to the Government in those particular areas will be measured to a certain extent through the performance indicators that have been agreed with this institution (See annex 1a). However, the full benefits of the Project's support to the development of a stronger legal and institutional set-up in the electricity sector are ultimately those that will be achieved by the overall sector reform, and are reflected in the evolution of the sector performance indicators (see Annex 1a): more electricity available to final users, greater reliability and efficiency in the sector, and prices closer to the economic costs.

Strengthening the capacity of the regulator, CONELEC as described above, would ensure that the rules will be implemented and would reinforce the credibility of the system. Both can be decisive factors to attract private investors in sectors like electricity, which require the commitment of substantial amount of resources over a long time period. They can also play an important role in building up and maintaining popular support for the reforms, as they ensure that part of the benefits from greater efficiency of the firms and additional investment in a competitive sector will reach the final users.

2. Development of a liberalized wholesale market and strengthening of CENACE

Supporting the modernization program of CENACE, the administrator of the wholesale electricity market (WEM) is critical for the development and functioning of a competitive power market. The Electricity Law and the corresponding regulations for the wholesale market provide a framework that promotes competition and economic efficiency, while opening the sector to private investment is likely to increase the number of participants in that market. Nevertheless, it will be difficult to realize the strong potential for greater competition and improved efficiency in the WEM, --and reap the corresponding benefits in terms of more

electricity, greater reliability and lower wholesale prices-- if CENACE is unable to operate the network efficiently and handle proper financial accounting for the settlement of energy transactions under the new commercial rules of the system. Currently, the WEM administrator operates equipment that is substantially out of date and uses information systems that rely on manual collection, which makes it prone to reviews and processes data with a significant margin of error. In addition, while the WEM is expected to grow over the coming years as the unbundling and privatization of electricity firms take place and the market opens to greater competition, CENACE lacks today the capacity to supervise real time transactions in a dynamic wholesale market with a large number of agents.

To overcome these limitations, CENACE has developed a modernization strategy and the Project will support its implementation by financing relevant studies and training programs to strengthen CENACE's capacity to administer MEM and by providing partial finance for the acquisition of equipment and software. The investment in equipment and software aims to improve the: (i) short and medium-term sector planning; (ii) real time operations of the interconnected system; (iii) settling of commercial transactions, (iv) commercial measurement system; and (v) information systems to support the technical and commercial functions of the MEM administrator.

Total costs of the investments amount to US$7,956,450, of which the loan would finance US$6,187,340. These costs are consistent with those of international bids for similar projects executed in other LAC countries. They have been reviewed by the Bank and found acceptable. Direct costs are expressed in current prices, and include provisions for taxes (import duties, VAT on local services and goods, and taxes on revenues of international consultants' services). Physical contingencies were estimated at 15%, which is reasonable for this type of works..

The most immediate benefits from investing in updated equipment and software, and applying modern market management techniques come from the improved precision in the measurement of power flows in the system, which will drastically reduce the error margin in settling commercial transactions in the WEM. CENACE estimated that inaccuracies in measurement result in an error of 1 percent of the value of the total transactions (Auditoría del Proceso de Administración y Lidadción de Transacciones Comerciales del MEM, Enero 2001).

Table 1 below summarizes the impact estimated by CENACE of a more accurate measurement of power flows on the commercial transactions in the WEM. The case without project is built on the basis of existing CONELEC's projections for demand growth under a "medium case scenario" and allows for some delays in the implementation of CENACE's investment program. The case with the project reflects the gains for the system of having more accurate measurements. Commercial transactions are valued at US$2001 prices. Note that although transaction volumes are expected to increase as a result of demand growth and measurement improvements, revenues from the transactions will fluctuate, as prices are expected due to increased competition and more electricity available in the WEM.

Table 1: Wholesale Electricity Market Projections: 2001-2010					
Year	**Electricity Demand at importing nodes (GWh)**		**Energy Cost (importing node) (US$/MWh)**	**Average Annual Revenues WEM (US$ Millions)**	
	Without project	With Project		Without project	With Project
2001	11,358.0	11,358.0	62,68	711.92	711.92
2002	12,010.0	12,010.0	77,17	926.81	926.81
2003	12,712.0	12,712.0	79,30	1008.06	1008.06
2004	13,458.0	13,592.6	39,84	536.17	541.53
2005	14,244.0	14,386.4	42,89	610.93	617.03
2006	15,120.0	15,271.2	47,75	721.98	729.20
2007	15,989.0	16,148.9	40,93	654.43	660.97
2008	16,909.0	17,078.1	43,55	736.39	743.75
2009	17,980.0	18,159.8	59,31	1066.39	1077.06
2010	20,136.0	20,337.4	43,46	875.11	883.86

Sources: (a) CENACE estimates; (b)"CONELEC: Plan de Electrificación de Ecuador, periodo 2000-2009; Octubre 2000"; and (c) . Restrepo, P et al: "Estudio de mercado del sistema Mazar-Paute- Molino", Mayo 17, 2001.

Table 2 summarizes the result of the financial and economic analysis of CENACE's investment program, using the increase in the volume of transactions on the WEM as a proxy for the benefits derived from investing in new equipment, software and management techniques. This is a conservative approach, for an efficient and dynamic wholesale market contributes in many ways to improve the overall efficiency and reliability of the electricity sector.

Table 2: Financial and Economic Analysis of CENACE's Investment Program			
Costs	**Financial Analysis**	**Economic Analysis**	**Fiscal Impact of CENACE Inv. Prog.**
Total: US$ 8.0M Net of Taxes: US$ 6.19M	NPV=US$ 19.3 M IRR=54%	NPV=US$ 20.5 M IRR=65%	Taxes= 1.54 (*) No subsidies

(*) The fiscal impact would be equal to US$0.2M instead if the Government applies the rule to waive import duties for goods and VAT on local consultant's services revenues, financed with the WB loan.

Main Assumptions:

- Demand and Prices for 2001-2010 are based on CONELEC's estimates under a medium-case scenario.
- Electricity prices are calculated at the importing nodes.
- Discount rate is 12.0%.
- Investments will take place in 2002 and 2003.
- The new system for measurement of commercial transactions will be in place in 2004. This

assumption allows for some delay in the implementation of the original investment schedule.

- Improvement in measurement of commercial transactions will yield an economic benefits of around 1 per cent of the demand as measured at the importing nodes.
- Import duty rate=30%; VAT= 14% on local good and services; VAT=0 % on imported goods financed with multilaterals' loans. Tax on income of international consultant services= 26.4%. If the Government applies the waiver, only the latter tax will apply.

The overall impact of the modernization program of CENACE on the performance of the electricity sector, however, goes beyond what is reflected in the cost-benefits analysis. Improvements in the management and operation of the WEM would lead to a projected reduction of transmission losses from 4.5 per cent in 1999 to 3.8 per cent in 2009. The improvements will also facilitate the competitive growth of transactions in the WEM, and make it feasible to meet the growing demand for electricity (annual growth rate of around 6 percent according to CONELEC) at a lower cost over the next 10 years. As shown in table 1, prices at the importing nodes are expected to decline from US$/MWh 62.68 in 2001 to US$/MWh 43.46 in 2010.

3. Fiscal Impact of the reforms in the electricity sector

The reforms of the electricity sector supported by the Project will create a favorable environment for increased private participation in the sector and are expected to have a substantial positive impact on the finances of the Government of Ecuador. The main sources of additional revenues for the Government will come from: (i) revenues from privatization, granting of concessions and payments of taxes of privatized firms; (ii) payment of dividends to the extent that the Government maintains partial ownership in the enterprises; (iii) relief of fiscal burden from loss-making enterprises; and (iv) payments of taxes by new investors in the sectors over the next 10 years. These fiscal benefits are substantial and will more than compensate the short term of the transaction and the assumption by the Government of environmental liabilities existing in the firms prior to their transfer to the private investors.

Fiscal Impact of the privatization program in the electricity sector

The Government program to modernize and privatize the electricity sector includes the sale of up to 51% to private investors and up to 10% to workers, of the shares owned by the Fondo de Solidaridad in the generation, transmission and distribution companies. It also includes the options for local government to sell their shares to the private investors. In the case of EMELEC, the transaction will include the granting of a concession, and the sale of assets, whose proceeds will be used to pay accumulated debts of the company with the Government (of around US$100 millions).

The Government has announced the sale of 17 distribution companies regrouped in two packages (Sierra and Costa, except Guayaquil) in a public international auction that will take place on September 28, 2001. So far three companies have signed up for the public auction: Argentina's Pecom Energia SA, owned by the oil company Perez Companc SA, AES Corp., the biggest U.S. power plant developer, and Union Electrica Fenosa SA, Spain's third-largest power company. The Government has announced the sale of Transelectric through an international competitive bidding that should take place during the second half of this year. It also plans to sell the six generation companies by the end of the first quarter of 2002, but it has still to define a privatization strategy for these enterprises. In particular, it remains to be decided whether Hidropaute and Hidrogoyán will be included in the list of firms to be privatized and whether they would be merged with Paute-Mazar and San Francisco, respectively. The final decisions on these issues will affect the expected revenues from privatization.

While it is still too early to estimate the value of proceeds from privatization and granting of the concession that will go to the central Government and to the local authorities, based on a conservative base case scenario (using historical values), the Government could expect to obtain US$354 million in income taxes over the next 10 years from the privatized companies, and the concessioned EMELEC. Furthermore, since the Fondo de Solidaridad will maintain partial ownership in the privatized companies, it will also expect to receive yearly dividends, which could amount over 10 years to US$382 millions.(CONAM, 2001).

A successful privatization program in the electricity sector will have a significant fiscal impact, beyond the numbers already indicated, because it will decrease the current expenses of the Government, in terms of general subsidies to the loss-making companies, and the partial assumption of their commercial debt. One can easily picture the magnitude of the expected savings from transferring the companies to the private sector --while implementing a tariff schedule that will bring the average cost to its economic value by mid-year 2002-- by considering that annual losses of distribution companies reached US$134 million in 2000, and payment arrears to the generation and transmission companies accumulated to US$279 million in that same year before decreasing to US$170 million in recent months, thanks to a mandatory repayment plan imposed by the Government. It is expected that with the privatization of the distribution sector, private investors will assume the remaining balance of this commercial debt. Increased efficiency in the operation of the firms in private hands should prevent the building up of new arrears in the payment of commercial transactions on the MEM, assuming that tariff adjustment bring prices closer to economic costs in the sector.

Private investors will also assume the balance of the distribution companies' external debt (mostly from Quito's and Manabi's companies), which does not exceed US$40 millions. The external debt of INECEL in the generation and transmission segments was much more significant reaching a total of US$971 millions. In 1999, this debt was allocated among the newly constituted generation and transmission companies, in proportion to the value of their assets. As in the case of distribution, private investors in the generation and transmission segment of the industry are expected to assume the remaining balance of the debt and will make the corresponding payments to the Ministry of Economy, which will in turn pay international creditors.

Economic impact of additional investment by the private sector in the electricity sector

The successful implementation of the Government's reforms to attract private investors in a more competitive environment will be key to ensure that necessary investments will materialize to enable the sector to demand increasing at an average of around 6 percent per year. Based on the expansion plan for the sector approved by CONELEC, additional investment of more US$3.04 billions will be needed over the next ten years to satisfy the increase in demand, of which US$2.2 billions will be needed in generation, US$0.251 in transmission and US$0.641 in distribution. Assuming that the flow of additional resources in the electricity sector is evenly distributed over the next 10 years, annual investment in the economy will increase by US$304.8 millions between 2001 and 2010. This represents 10 per cent of total investment in the economy in 2001 (US$3.2 billions, according to the Central Bank of Ecuador).

Telecommunications

Calculation of the Financial Rate of Return.

Rural Services. The new telecommunications legislation permits a special levy on end-user services and net international settlements, which is to be earmarked for the fund FODETEL to subsidize the expansion of telecommunications services in rural and other under-serviced areas, without creating a charge against

the government budget. CONATEL will award concessions for rural service provision to the companies that bid the minimum subsidy for the aggregate number of telephones in the bid. To calculate these subsidies, we have used regional averages in this analysis, using the examples of Chile, Peru, and Guatemala. Exact numbers will depend on the investors perception of the investment opportunity.

New Taxes. Finally, as new companies offer more services in Ecuador, they will pay taxes to the Government. The analysis estimates that the new companies will pay income tax at the prevailing rate. In our analysis, we calculated the amount that PCS companies will pay to the Treasury in income tax. We also calculated the amount that the Rural companies will pay to the Treasury for income tax.

Results. Table 1 below shows the results of the financial rate of return calculations.

Economic Rate of Return

Rural. In order to calculate the Economic Rate of Return for the rural telephony component of the project the estimated consumer surplus from rural telephone calls was added to the financial revenues generated by the operators. The literature suggests that a reasonable assumption for the price elasticity of demand of rural telephony services in Latin America is around -0.5 (Saunders et al., 1994). This price elasticity parameter was used to infer a linear demand curve starting from the initial level of predicted demand, and on this basis the consumer surplus generated at the predicted level of demand was estimated. In some respects, this could be regarded as an over-estimate in the sense that there is the implicit assumption that all of the telephone calls generated as a result of the installation of rural telephones would not have otherwise been made. On the other hand, this approach could be regarded as an under-estimate to the extent that it does not take into account the benefits accruing to the parties receiving the telephone call.

Table 1: Financial Analysis—Summary: Telecom

	Present Value of Flows (US $Millions)		Fiscal Impact	Fiscal Impact Taxes
	Economic Analysis	Financial Analysis		
Telecom Components US$7.91 m ($4.9 m WB loan)	Rural telephones: NPV=$11.1m Rural telecenters (PCs): NPV= $3.7m (1)	NPV= $1.0 m. NPV= $0.5 m	NPV= $45.2m	NPV=$46.8m No subsidies from the Treasury(2)

(1) For consumer surplus calculation, we assumed $1.50/hour as the value to consumers of the use of PCs, equivalent to a 6 minute long distance national phone call at $0.25/minute
(2) The rural development fund (FODETEL) will provide $4.15m to the investors to carry out the rural program.

Main Assumptions:

Rural Operator:

The rural operator will run 166 public offices, that include on average 3 public telephones and 10 PCs in each. The services offered will be telephone service, fax, PC use, Internet Access, E-mail, File Transfers,

printing, and training services.

Public Telephony

Traffic per day : 40 minutes per line, average
Price per minute: $0.15 for year 1, grows to $0.20 in year 6, stays at that for the rest of the period.
Cash expenses: $300 per line/year
Satellite expenses: $0.10 per minute
Depreciation period: 10 years
Financing: interest: 12%, amortization 10 yrs.
Rural Fund fees: 1% over net revenue
Lines served: 498 (8% of total)
Investment: $4,000/telephone (50% financed by the rural fund, 50% by operator)

Telecenters (PCs)

Usage per day: 4.5 hours/PC
Price per hour of use: $1.00
Expenses, operational, cash: $10,000/Telecenter/year
Satellite expenses: $300/month/Telecenter
Depreciation period: 5 years
Replacement of computers: each 5 years
Investment: $18,000/Telecenter for 10 PCs, including proportion of VSAT connectivity
Subsidy from Fund: $9,000/Telecenter for 10 PCs, including VSAT.
Total number of PCs: 1,660
Roll out plan: 553 per year in 3 years.

Video Conference facilities:

Classroom for 20 students
Video Screen 50 inches
Telephone return facilities and small PABX equipped with 20 telephones
Cots per facility: $10,000 (including proportional cost of VSAT)
Subsidy from the Fund: $10,000
Additional revenue stream from private use of facilities not included in this analysis. The main purpose of the facilities is to train teachers through a distance education program.

Taxes:

Income tax rate: 28%

ICT-based Business Development Centers for MSBs

The ICT-based business development services pilot, known as Ecuador MicroNet, aims to demonstrate in Ecuador the commercial viability and development impact of greater "connectivity" between lower- and higher-income markets, and how to substantially boost MSB client outreach with financial sustainability of ICT-based business development services. The MicroNet network would consist of 8 community-based business development centers, all of which would be in smaller secondary towns and rural areas, and a hub

located in either Quito or Guayaquil.

Initial total capital costs for this network are estimated at US$2.4 million, of which (A) US$1.6 million (67%) would cover the physical development of the centers and (B) US$0.8 (33%) would finance the development and updating of ICT local content in MicroNet services and its delivery system, staff and management skills training, technical support for the ICT network, quality assurance, and a client voucher program to increase the awareness of and promote ICT-based business development services. Bank financing would support 100% of the cost of part B for technical expertise, client incentives and dissemination activities, which has strong externalities and important risk mitigation effects for the pilot. Most of the costs of physical development of the pilot would be supported by the private partner group would cover 100% of the costs of leasehold improvements for facilities of the centers and 70% of the cost of ICT hardware, software, furniture and fixtures, with the Bank loan covering the remaining 30% pari passu.

An important goal of MicroNet as a pilot is to provide a positive overall rate of return through sound service pricing and maximum cost efficiency of operations. MicroNet's main design parameters target will include: (1) reaching financial breakeven by the end of Year 2 (2003); (2) achieving a positive net income of revenues by the end of year 4 (2005) (expected to approximate 5% of revenues), and (3) pay VAT and income taxes to the government as per business regulations. To accomplish this, service prices to be paid by clients would be set to fully cover direct delivery costs (including cost of goods sold, employee expense, facilities expense, and general administrative expense). These are expected to be affordable for MSBs, amounting to an estimated 0.5-1.5% of sales. At the same time, due to its new and quite experimental nature, the cost of development and updating needed to provide micro- and small business-appropriate value added through the provision of ICT local content, adaptation of hardware and software, and skills training would be covered separately as a research and development cost supported by the Bank's loan.

Ecuador MicroNet services would, subject to completion of the business plan, be expected to support some 12,000 microentrepreneurs each year at full operation (end Year 2) by (i) providing basic entry-level business skills training, information technology training and distance learning on microbusiness issues; (ii) making accessible modern traditional communications (phone, fax and photocopying) and marketing outreach tools (advertising, packaging and labeling) with coaching assistance; and (iii) offering PC-based workstations, software and coaching for more advanced microbusinesses to expand entrepreneurial knowledge, prepare strategies on how to grow their businesses, solve common problems in production, finance/credit and marketing, and begin to build networks and carry out electronic commerce. MSB development impact is expected to be substantial and manifest itself in changes in MSB practices (new products, higher quality products, new or lower cost sources of production inputs, keeping books, etc.), new client bases in higher income markets, and higher rates of employment and profitability.

The involvement of the Government and Bank financing would be justified by the expected benefits which MicroNet would generate beyond those appropriated by its private sponsors and clientele. These would mainly involve expanding (i) broad public awareness of the development value of ICT; (ii) private participation in creating ICT applications and local content for lower-income groups; (iii) extension of ICT services outside of the two metropolitan areas; and (iv) increased competition in the local ICT services market at reasonable prices. It would also engage other segments of the private sector toward the alleviation of poverty by drawing upon the capabilities of business-oriented NGOs, such as CORPEI, ASOEXPEBLA, and Camara de Industrias de Cuenca, which have substantive skills and business interests in the success of the microbusiness sector, and provide new opportunities for local ICT providers of internet services, programming and local content to reach new markets.

Main Assumptions:
See above text.

Cost-effectiveness indicators:[2]
Sector performance indicators as shown in Annex 1a.

Annex 4a: GEF ALTERNATIVE: PROJECT JUSTIFICATION, INCREMENTAL COSTS AND COST-BENEFIT ANALYSIS

I. Introduction

This annex summarizes the (i) current electric sector policy environment, and status and plans for rural electrification via grid extension and other means, (ii) barriers to improvement in electricity load management and end-use efficiency, and barriers to rural electrification in dispersed and isolated areas, (iii) expected benefits of the GEF Alternative Project, (iv) benefit cost and risk analysis for the project, and (v) detailed GEF incremental cost analysis.

The GEF Alternative is designed to help address several deficiencies which are usually not incorporated directly into power sector reform programs: *Off-grid electrification*: i) lack of an off-grid rural electrification strategy including market information and proven models for implementation, ii) lack of an institutional capacity to promote, design, execute, and lack of private participation for implementing off-grid power supply, iii)lack of coordinated funding strategy and clear multi-year budgets, and iv) insufficient capacity to address technical and O&M needs for off-grid renewable power supply. *Energy Efficiency:* i) absence of an energy efficiency policy and integration of efficiency concerns into reform strategy, ii) insufficient distribution utility and end user incentives and motivation, iii) lack of institutional capacity in the public sector for policy, promotion and coordination of efficiency initiatives, and iv) lack of technical and financial capacity in the private sector to assess opportunities and undertake efficiency investments.

The GEF Alternative will be developed in the framework of the power reform and privatization program, in order to ensure that the above issues are not left out of the reform agenda. It will be implemented by the Department of Renewable Energy and Energy Efficiency (DEA) of the Ministry of Energy and Mines (MEM), and the power sector regulator and indicative planning entity CONELEC. The GEF Alternative will pursue private involvement and financing - including distribution utilities, energy service companies, equipment manufacturers and dealers, financial institutions, NGOs, and consumers, and will be based on thorough market assessments and beneficiary consultation and participation.

II. Overview

Energy and Electricity System Characteristics in Ecuador

Ecuador still depends heavily on traditional fuels including wood, charcoal and agricultural residues (49% of end use consumption), in addition to its use of oil products (fuel oil, LPG and gasoline -- 34%), and electricity (16%). In urban areas and rural areas, these shares differ greatly due to both much higher average incomes and fuel availability. For urban vs rural areas, respectively, these fuel shares are: oil products 57% vs 20%, for electricity 35% vs 5%, and for biomass fuels 8% vs 75%. Furthermore, the average use of electricity per customer in rural areas is also much lower, averaging 96 kWh/month (in 1993) vs 193 kWh/month in urban areas. (Source: ESMAP, "Ecuador-Energy Pricing, Poverty and Social Mitigation", August 1994).

Poverty and Rural Electrification The degree of poverty in Ecuador has important implications for the rural electrification effort. Rural cash incomes are very low, unemployment high and access to basic public and social services inadequate. Malnutrition (39%), infant mortality and maternal mortality are very high for the lowest income groups. Economic problems in 1998 - 1999 significantly increased the general

problems of the poor, such as poverty, deferred medical attention, medical coverage, etc.

Energy price subsidies have been an important part of the GOE's safety net, but given the extremely high cost (estimated at US$400 million in 1998), the Government cut these sharply in 1998, to an estimated US$34 million, only to have them increase again in 1999 due to rising oil prices and exchange-rate depreciation (Source: World Bank, "Ecuador: Crisis, Poverty and Social Services," June 2000, pg. 82). The Bono Solidario became the backbone of the GOE's social protection system in 1998, when it was initiated to alleviate hardship when the GOE eliminated the subsidy on cooking gas, electricity and other fuels. In 1999, some 1.3 million households received this support, at a cost of about US$190 million, with household payments varying from $8-$15 per month (depending on period in question and impacts of inflation the value of the Bono may have dropped by half). Coverage is much higher in urban than in rural areas. Rural electrification is a policy priority of the GOE, will be supported by the project in a manner which seeks to minimize subsidies and emphasizes sound planning, implementation and sustainable operation.

Electrification Plans Ecuador's population was estimated at 12.4 million in 1999, and is projected to grow to about 15.20 million in 2010. Electricity reaches some 96% of the urban population but only 55% of the rural population (that is about 80% of the total population). CONELEC has prepared a 2000-09 National Electrification Plan to extend coverage through grid extension to an additional 750,000 households, at a cost of about $537 million of which the GOE contribution through FERUM is estimated at $400 million. The average cost per household connection was estimated at $361 in 2001 (latest approvals for 2001 average only $77 per household), growing to $824 in 2009. (Source: Anexo 7.06, "Planes de Electricación Rural y Urbano Marginal", Plan de Electrificación 2000-2009, CONELEC). This increase is due to higher average costs per household given location and load density. These plans would increase coverage to 98% of the urban population and 65% of the rural population (or about 85% of the total population).

The Fund for Electrification of Rural/Urban Marginal population (FERUM) is the primary source of GOE financing for expanded electrification. CONELEC is responsible for reviewing and approving the applications to this fund, which are submitted by "Consejos Provinciales" in coordination with municipalities and local electric distribution companies. Weighting criteria reflect both performance and social objectives. (See: CONELEC, "Normas Legales Relacionadas con El Ferum", Oct. 2000). The source of these funds is primarily the 10% charge on commercial and industrial electricity consumers, and 5% of the profits (not reinvested) earned by the GOE from the state-owned electricity enterprises. Distribution companies (which are in the process of being privatized) would have the primary responsibility for grid extension electrification. It is unclear specifically how concession contracts establish the obligation to participate in such social electrification.

Even under these plans, however, much of the population in remote areas would remain unserved. This population historically has used low quality but still relatively expensive alternatives to electricity, for example, kerosene, candles and batteries, for lighting. Data from 1992-93 (ESMAP, "Ecuador: Precios de la Energía", 1994) indicated kerosene for lighting is 64% to 73% of households in rural areas. While kerosene is reportedly unavailable today, the rural population has substituted a similar fuel called "kerosene," but which is actually a mixture of gasoline and diesel. Available information does indicate the likelihood that: a) in addition to capital subsidies for electrification, a significant part of the market may require operating cost subsidies, and/or would potentially be served more cost-effectively by very small-scale low cost systems (e.g. portable PV/lamp systems) suitable for remote locations; and b) the GOE will need a diverse and flexible strategy to deliver and sustain rural off-grid electricity services, for example, by relying on some form of concession approach in higher potential areas and local (community,

non-governmental organization, private) and public sector collaboration (e.g. poverty programs) in poorer and remote areas.

Energy Efficiency --- Impact of Electricity Prices and Economic Conditions Historically, electricity and certain fuel prices in Ecuador have been highly subsidized, and attitudes engendered by this experience appear engrained and politically very sensitive. The GOE has made major changes in electricity pricing policies, recently as part of the electricity sector reform process. Nonetheless, certain fuels remain highly subsidized. For example, LPG prices are roughly 20% of actual cost - e.g. $0.35 per kg vs a reference of $1.02 in Argentina. (Source: Ministerio de Energia y Minas, "Sector Energetico Ecuatoriano", June 2000). This price differential may be resulting in a shift from electric water heat in residential applications to LPG.

The most important factors affecting the electricity consumer recently have been:

· Economic Factors: very high rates of inflation, leading to devaluation followed by dollarization; negative growth in the gross national product (-7.3%) for 1998-2000.

· Electricity Price Adjustments: increasing from an average nationally of $0.0249 per kWh (after devaluation $0.0428) to the current $0.062 per kWh, with an additional increase of currently 4% per month, toward economic cost of about $0.10 per kWh, depending on fuel prices. (Source: CONELEC, Various Tables "Analysis de Los Precios Medios", Dec. 2000; and "Situación del Sector Eléctrico del Ecuador," Octubre, 2000).

Electricity Supply Characteristics The principal fuels used and operating characteristics of the power system in Ecuador can be seen in the table below. Hydroelectric generation capacity installed, 54.3% of the total, and is able to generate on a seasonal basis at high levels, producing in 2000 an estimated 75% of total gross energy. However, a substantial portion of this capacity has no storage, and therefore is unavailable during the dry season, and dependence on thermal generation during droughts increases. With such a large hydroelectric component, much of which is non-storage or run-of-the-river, the environmental impacts of electricity use is significantly diminished. Nonetheless, on the margin, there is still a high degree of dependence on diesel generation, primarily for peaking needs. Many of the old thermal plants have poor operating efficiency, and distribution systems suffer from high levels of technical and commercial losses in distribution, estimated currently at about 22%. Furthermore, a large part of additional generating capacity in the 10-year indicative expansion plan is thermal-based.

Table 1. Ecuador Power System Characteristics (2000)

Category/ Plant Type	**Hydroelectric**	**Thermal (Diesel)**	**Thermal (Fuel Oil)**	**Total**
Production Gwh (gross)	3,975	853.5	474.5	5,303
%	75%	16.1%	8.9%	
Installed MWs	1,693	984	440	3,117
%	54.3%	31.6%	14.1%	
Fuel Used		Diesel	Bunker	
Gallons (000)		26,521	69,493	
Maximum Demand (MWs)				1,840.9
System Losses (%)				22%

Source: CONELEC, "Estadística del Sector Eléctrico Ecuatoriano", Jan.-June 2000.

Electricity Demand CONELEC's growth projections ("Plan de Electrificacion Rural 2000-2009, Oct. 2000") for electricity consumption are subject to high degree of uncertainly due to both the recent downturn in economic activity and higher electricity prices (neither of which is incorporated in the projection). Gross Domestic Product (GDP) is forecast to grow 4.9% per year. The projection does incorporate the effects of population growth and urbanization, increased average consumption as income grows, and increased rates of electrification. This projection is used as a basis for sensitivity analyses in this annex. The average national electricity growth rate in this case is 5.7%, with 6.7% growth in household use and 10.5% in industry. Also important for energy efficiency considerations, is regional diversity. For example, using 1993 data to disaggregate the forecasts, industry use accounted for 58.5% on the Coast vs 41.5% in the Sierra, and commercial use 63% on the Coast vs 37% in the Sierra.

Future Electrification A majority of the rural consumers to be connected in grid extension are in the 3 distributor concession areas of Ambato (Area: 40,969 sq.km.: Provinces Tungurahua, Pastaza, Napo, Morona Santiago), Sucumbios (Area: 37,959 sq.km.: Provinces Sucumbios, Napo, Francisco de Orellana) and Centro Sur (Area: 30,364 sq.km.: Provinces Azuay, Canar, Morona Santiago). The primary responsibility for expansion of electrification in these areas is with the distribution utilities, who generally must connect any consumer requesting service of less than 10 kW at a distance not to exceed 200 meters. Otherwise connections are made only for "projects" where FERUM or a project sponsor subsidizes construction costs sufficiently to permit the local distribution company to earn its normal rate of return on this project. Assets subsidized by FERUM are converted into shares in the distribution entity under the national solidarity fund.

The cost benefit analysis of electrification and selection of projects is accomplished under FERUM guidelines by CONELEC. These guidelines are weighted to emphasize the least cost projects per household connected. However, they also give added weighting to favor frontier areas, Amazon and the Galápagos (20 of 100 pts), and also financial efficiency and equity. Some weight (5 pts.) is given to renewable resources uses. The absolute financial limitation of FERUM is $590 maximum per household. It is unlikely that isolated household projects such as PV projects will be of sufficient priority or low enough in cost to qualify for FERUM financing. CONELEC furthermore, has a large inventory of projects which involve grid connection of rural areas at relatively low costs, which will compete for available funds. No other regular funding is currently available from GOE sources for electrification. Other social funds from the national solidarity fund (those not derived from fees on the electricity sector), are dedicated to non-energy social infrastructure investments.

Table 3. Ecuador Off-Grid Rural Electrification Market by Province (Households)

Low-Density	Totals by Area		Not Electrified			Not electrified
	Households		Fraction	No.	Fraction	No.
	1,999	2,009	1999	1999	2009	2009
Amazon & Sierra						
Bolivar	37,825	45,704	0.43	16,265	0.4	18,281
Napo	16,513	19,952	0.55	9,082	0.52	10,375
Orellana	13,147	15,885	0.65	8,546	0.6	9,531
Morona	26,778	32,356	0.54	14,460	0.5	16,178
Sucumbios	25,375	30,661	0.63	15,986	0.58	17,783
Zamora Chinchipe	19,065	23,036	0.46	8,770	0.44	10,136

Pastaza	12,260	14,814	0.39	4,529	0.36	5,052
Galapagos	2,856	3,451	0.02	57	0.01	35
Zonas No. Delimited	14,935	18,046	0.48	7,169	0.47	8,482
Subtotals	168,108	203,122		84,864		95,852
Higher-Density Sierra & Coast						
	1,999	2,009	1999	1999	2009	2009
Azuay	124,738	150,718	0.15	18,711	0.1	15,072
Canar	44,400	53,647	0.26	11,544	0.2	10,729
Carchi	33,826	40,871	0.19	6,427	0.16	6,539
Chimboraza	63,965	77,288	0.25	15,991	0.2	15,458
Cotopaxi	86,341	104,324	0.12	10,361	0.05	5,216
El Oro	108,014	130,512	0.1	10,801	0.08	10,441
Guayas	659,797	797,220	0.1	65,980	0.07	55,805
Imbabura	66,453	80,294	0.22	14,620	0.18	14,453
Esmeraldas	83,442	100,821	0.36	30,039	0.32	32,263
Loja	88,664	107,132	0.33	29,259	0.29	31,068
Los Rios	131,257	158,596	0.39	51,190	0.35	55,509
Manabi	253,003	305,699	0.32	80,961	0.28	85,596
Pinchincha	470,589	568,604	0.09	42,353	0.07	39,802
Tungurahua	89,606	108,269	0..06	5,376	0.04	4,331
Subtotals	2,304,096	2,783,996		393,614		382,282
Overall Totals	2,472,204	2,987,118		478,478		478,134

Source: CONELEC, "Plan de Electrificacion del Ecuador -Periodo 2000-2009," Octubre 2000, pg. 157.

Table 3 shows the overall market estimate for potential electrification for households. The market has been subdivided into those low and high density provinces, respectively, which are likely to present more uniform characteristics for electrification planning. That is, the higher density and more electrified areas such as the Coast and some of the Sierra are likely to be logistically less difficult to reach and may have higher ability to pay given access to commercial markets and employment opportunity. In order to obtain a more refined rural off-grid electrification market estimate, peri-urban and other areas which are cost-effective to electrify with grid electrification but which remain unserved, would need to be excluded.

III. Barriers to Overcome

Energy Efficiency Barriers

Due to a history of subsidies in the energy sector, the efficiency of both electricity and other fuels use in Ecuador is very poor. This is exhibited in both the inefficient consumption habits of end users and in the existing lighting, appliances and equipment in homes, buildings and factories. These characteristics continue in the technology and equipment available in the marketplace and the lack of institutional infrastructure in government and private sector institutions which could address this issue. A few studies and program proposals over the years such as the 1994 INECEL study of energy efficiency opportunities in the electricity sector, and energy audit program supported by USAID (and others), have had minimal

impact, due largely to low domestic energy prices, lack of institutional commitment and lack of supportive policy.

With recent changes in Ecuador's electric sector policy leading to reforms in the power sector and associated rationalization of electricity prices, an appropriate cost structure for electricity is being put in place, which should gradually motivate energy users to change attitudes regarding electricity and associated equipment purchase. Nonetheless, there remain important constraints to substantial changes in energy consumption and end use equipment decisions. These constraints include:

- long-engrained habits and attitudes;
- high first-cost of energy efficient equipment;
- absence of specific tariff incentives such as time of use tariffs for industry;
- lack of a general understanding in all end use sectors of energy costs and how these can be cost-effectively reduced;
- lack of availability of more efficient major electricity using appliances such as refrigerators and air conditioners, and lack of standards and efficiency labeling for these equipment;
- lack of institutional capacity to develop a strategy to address efficiency needs including critical stakeholder involvement in manufacturing, the electricity industry, equipment suppliers, and consumer groups;
- lack of technical understanding and capacity in those designing and operating more efficient major energy consuming systems in commerce/buildings and industry; and finally
- continuing subsidies in some fuels such as LPG, the primary commercial fuel used for household cooking and increasingly for water heating.

Rural Electrification Barriers

The scope for rural electrification in Ecuador remains extensive and is particularly problematic to address due to the large segment of the rural population with dispersed settlement patterns are infeasible to economically connect via the tradition means of grid extension. The financial motivation of distribution utilities to serve this rural population by alternative means is further reduced by the very low-income of this population. Furthermore, this group often does not enjoy other complementary infrastructure such as roads and communication, potable water and easy access to health and education. Institutional capacity for supporting either utility managed or publicly initiated electrification for dispersed and isolated populations is weak at both the national and local levels.

The Government of Ecuador (GOE) through its MEM has begun to address some of the electricity needs for this rural population through initiatives aimed at public services such as health clinics, schools and community centers. Some $1.0 million in funding has recently been made available for initial efforts to install PV systems in public services in remote frontier and Amazonian regions (Corporación Andina de Fomento (CAF). A prospective electrification initiative under the management of the Ministry of Defense (MOD) involves plans for the provision of electrification through PV installations in the frontier areas of Peru. This plan is not at this time coordinated with other national electrification plans or programs, and is potentially higher in unit cost and its compatibility and impact on the PROMEC and GEF Alternative described here is unknown. It may also be difficult to ensure sustainability of the MOD program since it is outside of the institutional strengthening framework of the PROMEC project and GEF Alternative.

Several key constraints appear likely to impede rural electrification initiatives. These include:

- low income of the rural population and dispersed settlement over a large geographic area,

- high first-cost of renewable energy systems such as photovoltaic systems for rural electricity supply,
- lack of established commercial enterprises addressing such markets, and lack of associated technical capacity at the rural level,
- lack of financing and credit systems to facilitate purchase of such systems,
- lack of financial motivation and regulatory obligations for distribution utilities to serve dispersed populations,
- inappropriate scale and cost-structure for distribution utilities to cost-effectively implement small-scale dispersed electricity supply,
- poor understanding of the rural market and willingness to pay,
- weak technical capacity for defining appropriate renewable systems for the diverse and very low income markets,
- weak institutional capacity for development and implementation of an overall electrification strategy for isolated (non-grid connected) areas, and
- lack of financing sources and strategy for expansion of electrification beyond grid connection.

Pilot projects and demonstrations are important mechanisms, along with the development of an overall electrification plan and administrative structure, through which the MEM can develop experience with delivery mechanisms, financial administration and maintenance, and private vendor and distribution utility participation. The GEF/WB project will help to define and fund pilots to meet these goals. Non-GEF funding will be used to finance non-renewable energy systems as possible options

Strategy to Remove Barriers

Energy Efficiency In order to address the barriers above, the GEF/WB project will proceed on several fronts: (a) assist the GOE/MEM efforts to develop an effective public information and motivational effort regarding reducing energy cost via improved energy efficiency, and support improvement in institutional capacity to undertake this overall effort, (b) support implementation of financial incentives through improved tariff design for load management, development of innovative utility and/or other financing mechanisms for DSM investments, and/or regulation by CONELEC; (c) support technical capacity development through training and information transfer in the commercial and industrial sectors, and among energy service firms, as well as support commercialization of advisory services and expansion of associated efficiency financing alternatives (such as ESCOs); (d) develop an implementation strategy which assists and motivates "strategic partners" among key end user groups (e.g. industry, commerce, architects, consumer groups), and service and financial delivery vehicles mechanisms such as distribution utilities, ESCOs and equipment suppliers; (e) address equipment and appliance standards issues through informational (e.g. labeling) and information transfer programs (e.g. international norms) to upgrade the efficiency of new equipment, and (f) support key demonstration projects that would test innovative delivery mechanisms for energy efficiency and load management (in particular for compact fluorescent lighting), as well as new energy efficiency technology not currently available in Ecuador. Demonstration projects will verify results to motivate replication, and develop key relationships for sustaining and expanding these initiatives.

Rural Electrification The barriers to rural electrification cited above are difficult to overcome, and require that this project must necessarily be part of a long-term commitment within Ecuador to provide rural isolated electricity services. An implementation plan and operational strategy is also required which is not only compatible with the low income and dispersed characteristics of the target population, but also with the capacities and financial motivation of distribution utilities, equipment vendors and potential concessionaires. The strategy must be flexible to adapt to circumstances and sustainable within the

expected capacity of both current project supporters such as the MEM and end users and participating local groups.

The project intends to address these barriers through support for: (a) strengthening the capacity of the Ministry and Energy and Mines (MEM) and CONELEC including through development of a national rural electrification plan, and supporting regional and local entities who will be implementing partners, (b) assisting MEM and CONELEC in the definition of an appropriate funding mechanism for the off grid electricfication program, which will ensure the financial sustainability of off grid electrification; (c) performing a diagnosis of the status rural electrification, evaluation of institutional requirements for electrification and potential models for implementation, and evaluation of appropriate technology solutions (e.g. size, cost and level of technology); (d) determine the potential market for electricity supply in dispersed areas particularly current energy use patterns and the ability to pay, and related subsidy and financing requirements, (e) determining policy and market constraints which effect availability and cost of rural electrification equipment, the quality and reliability of equipment, and through technical assistance, develop remedial proposals; (f) developing and promoting institutional and dissemination approaches as part of an overall strategy, for example:

(i) develop delivery options including subconcessions and other approaches tailored to local markets,
(ii) support initial stakeholder involvement to enhance market development, and participation and support to ensure sustainability,
(iii) develop of a sound subsidy policy, along with adequate user payments and financing activities to not only ensure electrification but also sustainability,
(iv) coordinate with other development initiatives and infrastructure programs,
(v) promote income producing activities, and
(vi) define financing options and a long-term financing strategy.

And finally, (f) implementation of demonstration projects tailored to market conditions and replication to ensure expansion and sustainability. It is recognized that the diversity of the rural market make it necessary to examine a variety of models. For example, the concession model is likely to be well-adapted to higher potential areas where markets are expected to expand and O&M cost recovery is relatively high. For other areas where extreme poverty requires high levels of subsidies for capital and O&M costs, and which are less compatible with commercial vehicles, the project will enlist participation of local organizations such as NGOs, churches, community groups to lower costs and create a sustainable implementation framework. The project will also support policy and technical barrier removal for certain renewable energy options such as small hydro and wind to accelerate and expand their market penetration.

Organizational Arrangements for Project Implementation

Energy Efficiency. The Ministry of Energy and Mines (MEM) will be the primary agency responsible for executing the energy efficiency component of the PROMEC project. CONAM will have responsibility for financial administration and procurement for project funded technical assistance and hardware. CONELEC will have a parallel responsibility to that of MEM in its role as the principal regulatory agency for the electric power industry. MEM and its Department of Renewable Energy and Energy Efficiency (DEEA) have 3 staff devoted to informational and promotional related efforts involving energy efficiency and 1 staff working on norms and standards. It is clear that MEM is a highly motivated and productive organization. Nonetheless, MEM as presented staffed, also appears substantially overburdened, to carry out its existing responsibilities, let alone additional duties imposed by this project. Substantial outside interest and pressure also exists for MEM to give greater support and attention to energy efficiency at this

time, due to both peak electricity demand exceeding supply, and due to the need to mitigate the higher cost of energy as prices reach economic levels.

It is recommended that MEM efficiency program staff be reorganized into an expanded unit with responsibility assigned for implementation of the PROMEC efficiency activities. An addition of a minimum of 2 additional positions is required. These would have lead responsibility to address: (i) the institutional, economic analysis, utilities regulatory incentives and market analysis aspects of the project, and (2) the technical assistance, training, ESCO promotional and pilot project aspects of the project. Addition of only these 2 positions is only sufficient by taking advantage of the significant ongoing activities of 4 other staff of MEM at this time, and by the provision of a substantial component of local and international consultant support by the project. Furthermore, CONELEC is staffed in its planning and tariff regulatory units with professional staff who will work as additional counterparts for the regulatory and tariff incentives aspects of the project.

It is expected to be necessary for MEM to add additional staff at a rate of 1 per year (beginning in year 2) over the project life as the external support diminishes. It is noted however, that given the focus of the project on sustainability and replication through distribution utilities, incentives created through CONELEC regulation, strategic partnerships and capacity strengthening of end users in industry and commerce and ESCO support, together with norms and standards, that less centralized institutional capacity may be needed in the future.

Off-grid Rural Electrification.. The Ministry of Energy and Mines (MEM) will also be the primary agency responsible for executing the rural electrification program. CONAM will have responsibility for financial administration and procurement for project funded technical assistance and hardware. CONELEC will have a parallel responsibility to that of MEM in CONELECs lead role preparing the national plan for rural electrification. CONELEC will also take the lead in with acquiring and utilizing the GIS planning tools funded by the project, with substantial participation by MEM.

MEM and its Department of Renewable Energy and Energy Efficiency (DEEA) does not now have the organizational structure nor staffing to effectively meet either its existing or new responsibilities imposed by this project. Rationalization of the MEM organization for off-grid electrification should come as part of the plan and strategy preparation exercise funded by the PROMEC project. However, in the interim 1-2 year period, it is essential that MEM create an organizational structure to effectively administrative this project. In Table 4 below we outline the major functional responsibilities that will be required for implementation of this project. These responsibilities will be performed by MEM, supported by consultants and contractors and by CONAM. Nonetheless, it is clear that MEM must set up an organizational unit and devote at least four new staff positions to act as lead for each these task areas. It is not necessary that these positions be exclusively devoted to this project, for example, MEM has responsibilities for the US$1.9 million CAF program for public service electrification and small-hydro development. These functions would fit well into this organizational structure. Furthermore, it would be better if MEM did not create a project-specific organizational structure since many of these functions are integrally related to other activities of MEM and should be coordinated.

IV. Benefits

Energy Efficiency

The EE program will result in significant reductions in electricity end use and associated reductions in GHG emissions. This will occur initially at small levels through the project's demonstration activities, and

expand substantially through project related and independent actions throughout the residential, commercial and industrial sectors. These savings should be sustainable as a result of market based electricity prices for all consumers except the lowest consumption class in the residential sector, and sustainable for this latter sector as the more efficient technology, particularly for lighting, is introduced and demonstrated, and possibly supported through gradually decreasing financial incentives. The project will promote dissemination of energy efficiency knowledge throughout the economy, and creation of energy efficiency service capacity. The project will also promote direct distribution utility participation in this effort through proposed incentives including rate of return and tariff incentives, and financing institution involvement. A secondary benefit of the project will also assist the commercial and industrial sectors in reducing their costs of production and achieving a more competitive cost structure vs international competitors. Industrial production and energy efficiency investments go hand in hand, and the project will help to stimulate both. A complementary benefit of electricity efficiency efforts will be improved efficiency in the use of other fuels such as fuel oil and diesel in industry.

Projected net benefits or cost savings in present value terms and reduced CO_2 emissions for an assumed 10 year project life plus replication period are described below. It is important to note that realized CO_2 benefits will be variable due to dependence of Ecuador on hydroelectric generation. Future expansion plans and economic dispatch of the system will determine what plants are actually used and to what degree.

Rural Electrification

The direct benefit of the project will be support for electrification for an estimated 2,800 concession systems the majority of which are for households. Some of these may serve a modest number of productive uses as well. Systems will also be supplied for approximately 1,100 households using low-cost solar lanterns, and 100 public service installations in rural dispersed and isolated areas. Note that in this latter case, public systems will be coordinated with rural telecom systems, in order that both have the benefit of implementation and potential joint-concessions. These public systems are only those directly supported by the project, that is, accomplished through the World Bank loan, GEF financial support and private contributions. Substantial related assistance to the MEM in mobilization of other funding sources, capacity development and technical assistance, is expected to lead to significant replication. In order for this replication to occur, it is essential that the national plan and related financing strategy be successfully developed. The implementation of the plan partially financed by the project will involve a number of key areas, including institutional strengthening and technical capacity development in the private sector, support for essential market studies and development of effective dissemination approaches, and design of sound user contribution and subsidy policies, and developing a long-term financing strategy. These project inputs will ensure replicability beyond the direct support targets of the project and sustainability of the institutional structures and program developed.

The project will directly contribute to improved living conditions in rural remote areas. A related indirect impact will be to encourage reduced migration which might occur due to lack of high quality household public services such as schools and health clinics, household lighting and power supply. It will directly support some income producing activities and indirectly support income enhancement through contributions to enhancing education, health and agricultural productivity. Due to the very low income of many rural residents there is a limited ability to pay for new electricity service and correspondingly need for outside contributions to capital costs. This will vary by area and the respective economic potential.

In the energy efficiency and rural electrification economic and financial analysis cases shown below, we consolidate the results of the analysis of the pilot projects. In order to estimate the potential overall impact

of the project, this analysis addresses both the direct impacts of the pilot projects and moderate replication of efficiency activities and electrification approaches, respectively.

Table 4. GEF Alternative Benefits - Summary of Base Case Results

Project Components	Benefit Measure	CO_2 Reduction in tons (a) (b)
Energy Efficiency (NPV of Benefits)	Net Economic Benefits (US$000) US$42,795	 2,154,260 (10 years) GEF Cost/Ton $0.76 Overall Cost/Ton $9.55
Rural Electrification (NPV of Benefits) DR= 12% for economic case	Electrified Households: 3,950 households and 100 public service centers electrified NPV break-even (plus in-direct benefits not calculated but at least equal to direct amounts).	 192,367 (10 years) GEF Cost/Ton US$2.68 Overall Cost/Ton US$20.96

(a) For energy efficiency, carbon dioxide conversion based on avoided thermal generation including transmission losses of 10%; a factor of 3.06 kg CO_2/kg diesel is used to calculate basic emissions impacts. For rural electrification, the calculation is based on avoided small diesel generators for public service uses and household lighting the most common fuel which is "kerosene" (diesel - gasoline blend).

V. Cost Benefit and Risk Analysis

Benefit-cost Results Benefit cost analysis has been carried out for subprojects and the overall project by component (detailed calculations are in project files). For the energy efficiency component the full implementation of the programs described is estimated to result in NPV's of net benefits in the base case ranging from US$42.8 million to US$17.3 million in the worst case, and US$186.7 million in the most optimistic case. The high IRRs indicate excellent prospects for project replicability, once existing barriers are overcome through the GEF Alternative. Note that is the base efficiency case we assume modest continuation of the program implementation or replication; but we do not give the efficiency measures credit for their impact on utility peak demand and decreased need for new capacity. For the rural electrification component the NPV's of net benefits range from -US$43,000 in the base case to US$500,000 for the case where "kerosene" prices are raised by about 25%.

We have analyzed the impacts of capital costs, project lifetime, discount rates, project costs and market demand levels. The tables below summarizes the information on NPVs.

Table 5. Economic and Financial - Energy Efficiency

	Net Present Value of Flows (million US$'s)			
	Economic Analysis		Financial Analysis	
	Low	High	Low	High
NPV Benefits	30.0	231	29.8	220.1
NPV Costs	12.0	44.6	12.5	43.4
NPV of Net Benefits	17.3	186.7	17.4	176.7
IRR (%)	80%	421%	88%	473%

Table 6. Economic and Financial - Rural Electrification

	Net Benefits 10 Years (000 US$'s)			
	Economic Case		Financial Case	
	Low	High	Low	High
Net Benefits	-510	1,149	- 791	843

Note: Economic case: DR= 12%, Financial case: DR=15%, IVA=12%, Elect Tax=30%. These off-grid benefits do not include benefits of improved lighting, improved educational opportunity, etc. which could easily double the benefit values. Unfortunately, data is too scarce to allow the quantification of these impacts for Ecuador. High cases assume 25% decrease in PV and other capital costs and 25% increase in diesel prices; and low cases 25% increase in capital costs and 25% decrease in diesel prices, respectively. Results are extremely sensitive to assumptions.

Risk Analysis

(a) Subproject or Benefit Failure. This is defined as any situation that reduces the benefits of the project, such as lower than expected energy savings or reduced number of households electrified. For substantial reductions the overall efficiency measure penetration rates, -50%, the benefits remained positive with NPV of benefits of US$21.7 million, and EIRR of 128%. The greatest uncertainty in the efficiency case is the degree of market penetration and unknown project-independent impact of higher prices. In the off-grid electrification case, the high initial capital costs tend to make delays in the project appear attractive. This anomaly is due to the high first cost and long-life of PV equipment. Considering life-cycle costs, we see that for the large majority of cases, that is, for 50 W systems that the life-cycle costs of about $9.29 (financial terms) are nearly equal to current lighting expenditures. Thus economic benefits should roughly equal costs. Adding a factor for improved quality of lighting, a amount generally considered to roughly equal this value, significantly increases this value.

(b) Higher or lower system costs. Higher costs for efficiency measures had a major impact on the economic benefits of the project. However, given the highly positive rates of return for this component, increasing costs by 50% while reducing NPV substantially , still resulted in large and positive returns

of US$25.8 million and an EIRR of 63%. For off-grid electrification the most important consideration is the potential impact of cost reductions which may occur as the volume of PV sales and service increases. For a capital cost reduction of 25%, the NPV improves by US$900,000 in the financial case, and in the economic case by US$803,000. In the case of rural electrification, a 25% cost reduction substantially improves the returns to the project, from an economic NPV of -US$6,000 to US$510,000. Since cost reductions are expected as the project proceeds, and as the market develops in Ecuador this is expected to be the direction of change. The effect of a similar increase in cost is equivalent but in the opposite direction.

(d) Induced demand. In the off-grid rural electrification case, we improve the overall economic return of the project if we include potential growth impact benefits of the project only where we assume cost reductions or increased cost for substitute fuels. Likewise, this impact would be positive if we included indirect impacts or the social benefits of improved lighting.

(e) Generation Capacity Savings: Efficiency measures particularly in the lighting area have potentially large impacts on utility peak demand and likewise generation capacity requirements. We have evaluated efficiency investments both with and without these credits to highlight the magnitude of these benefits, and to reflect the initial uncertainty which is associated with projected savings from such measures. In the base case for example, the affect of including capacity cost credits is to raise the base NPV of US$42.8 million to US$83.9 million. The project has been designed to help measure the peak demand reductions from efficiency measures, and to develop the means to support incorporation of these in generation, transmission and distribution planning and investments.

VI. GEF - Incremental Cost Analysis

Implementing the electrical energy efficiency and rural electrification strategies described above requires incremental costs, defined as the difference in the economic cost of the Baseline Situation and the GEF Alternative, that produce global environmental benefits. This difference is proposed to be supported by a GEF grant. Presented below program descriptions for the energy efficiency and rural electrification cases, respectively, and the associated GEF Alternative and respective Incremental Costs.

Baseline Scenario

Energy Efficiency In the absence of the GEF Alternative, Ecuador's electrical sector efficiency is anticipated to improve slowly and only moderately even in the long-term. Power sector reform is leading to introduction of market based electricity pricing, however many historical patterns, structure and technical constraints will limit efficiency improvements. New appliances, equipment and buildings being constructed will not incorporate cost-effective energy efficiency potential due to higher first cost and lack of tariff incentives for load management, public information and technical knowledge. Recent policy of Government mandating a 15% reduction in their own electricity use indicates that efficiency is a high priority and GOE responds to impending capacity shortages in the near-term. Nonetheless, many past efficiency efforts have languished, such as Demand-Side Management (DSM) and promotional efforts of distribution utilities, such as Empresa Electrica Quito, due to lack of management interest and overall poor financial performance on the part of the company. Impending privatization should change these attitudes toward system efficiency, but will require external assistance to develop well-crafted regulatory incentives and associated tariffs to promote utility investments and to assist end users to realize efficiency potential. The baseline recognizes existence of very limited energy service (ESCO-type) activities at this time, but anticipates no significant growth in these without additional technical assistance, innovative financing and

contracting support, and development of markets by promoting both utility, industrial and commercial sector initiatives. The baseline introduces improvement in efficiency from largely price induced actions, both in reducing the level of energy service by reduced household lighting (for example), and in a modest shift to fluorescent versus incandescent lamps. The dependence of pilot projects largely on private and end users for financing for hardware investments and for direct implementation, reflects the projects strong assumption that greater price induced incentives do exist.

Under the Baseline Scenario: (a) public and technical information dissemination will remain very limited, (b) financial incentives and financing for energy efficiency investment will be minimal except for revised electricity pricing, (c) labeling and testing of appliances and equipment for energy efficiency will not be introduced, (d) industry and commercial energy efficiency efforts will remain fragmented and implemented only by the most effective firms, and (e) no utility industry end use efficiency programs will be developed and implemented.

GEF Energy Efficiency Alternative

Energy efficiency alternative relies essentially on private capital from consumers, banks, ESCOs and electric distribution utilities for implementation. This is consistent with the view that energy efficiency is highly profitable from a financial standpoint, but that it is constrained seriously by barriers as discussed above.

The following outlines the major elements of the GEF Alternative efficiency support for Ecuador, to be implemented with MEM/DEREE (estimated costs without taxes).

1. Constraints and Opportunities Assessment, Market and Load Studies and Economic Analysis: US$307,000 The project will be identify legal, regulatory and market constraints to increased energy efficiency, and assist in implementing appropriate methods for mitigation. Consideration will be given to such issues as tax treatment of efficiency investments, import and tariff treatment of equipment and instrumentation and overall availability of both equipment and technical services. The project will assess a variety of incentive options including innovative electricity tariff design and other approaches to support efficiency, as well as evaluating the terms, conditions, general availability and cost of financing for efficiency investment. Among the financing initiatives for efficiency activities to be considered will be a potential levy on utility bills (e.g. 1%) to support investments. The project will work with CONELEC and MEM to integrate the distribution utilities, statistical agencies and end users, into this program to ensure necessary data is regularly assembled and analyzed to support efficiency and investments and evaluate results. The project will, for example, support market and load studies to assist in project design and implementation, and will develop an efficiency related database on energy use, efficiency opportunities and related technical information to support remedial actions and investments. The project will also support cost/benefit analyses of efficiency investments and assist in incorporating these considerations into distribution utility and least-cost generation planning.

2. Efficiency Training, Technical Assistance and ESCO Support US$461,000 Assistance will be provided for stakeholder involvement by means of informational and promotional workshops. The project will support capacity development of the MEM through both formal and on-the-job training. Support will be given, for example, to internal governmental efficiency programs, including improving building operations, procurement policy, new construction standards and employee efficiency education. Technical training will be offered to the private sector including ESCO and technical professionals in industry, commerce and electric utilities. Topics covered will include basic good housekeeping, mechanical system and system controls, lighting, demand management, performance contracting, energy management, boiler

and furnace efficiency, steam system optimization, waste heat recovery, cogeneration, fuel substitution and opportunities for industrial process improvement. Training for CONELEC will help to incorporate efficiency objectives in utility planning and regulation, for example, through improved tariff policy, defining necessary market and load studies, broadening criteria for distribution utility investments to support end use efficiency opportunities, and by considering efficiency investments in indicative supply planning. Technical support will also be provided to utility and other technical personal in demand side management including tariff structure experimentation, and identification and undertaking efficiency related demonstration projects. The project will devote substantial resources to strengthen and encourage ESCO-type enterprises including through assisting them to develop analytical capacity, prepare effective ESCO-type contracts and agreements, and facilitate interaction with potential international partners. Project pilot projects below will provide initial seed monies for applying this knowledge through support for energy audit, pre-feasibility studies and implementation of various efficiency opportunities

3. Information, Motivation and Standards and Norms. US$163,000 A complement to other project initiatives will be efforts to improve end use equipment purchase and replacement decisions. This requires GEF/WB support in several key areas (e.g., for air conditioners, refrigerators, lighting and motors) including labeling to inform consumers of the life-cycle cost of new equipment and encouraging upgrading the efficiency of products available in the local market through cooperative activities with local manufacturers or importers. The project will also support efforts to improve new construction standards. Substantial relevant information and experience from Mexico and Brazil (for example) will be transferred to lower the cost of this activity. This subcomponent will be coordinated with task 3 above involving financial incentives and innovative financing approaches such as for efficient appliance or lighting rebates, distribution utility financing and specific ESCO financing support, to stimulate the investment in higher first-cost but lower operating cost equipment. The project will also provide design and evaluation assistance for MEM informational and public educational efforts on energy conservation. The project will incorporate OLADE as a facilitator for regional workshops to both share experiences of other countries to advance work in the project (e.g. on labeling and appliance standards and DSM), and for promoting regional replication objectives of the GEF Alternative among OLADE's 26 member countries.

4. Pilot Projects and Demonstrations US$5,772,000 The project includes support for several key pilot projects which will test sustainable and replicable mechanisms for implementing energy efficiency investments.

1. Residential Efficient Lighting (US$430,000 including TA for US$125,000): This pilot will consist of two energy efficient lighting projects. Each will use a different financing and implementation approach. Project support will consist of technical assistance in design, baseline information gathering and analysis, monitoring and evaluation, and results dissemination. The first pilot will support vendor/utility initiatives to cooperatively introduce CFL’s with vendor sales and vendor equipment financing. The second pilot differs in that it is based on project-specific financing by a commercial bank in cooperation with a distribution utility.

2. Energy Efficiency /ESCO Projects - Private Financing for Public Service Efficiency Investment (US$2,665,000 including TA for US$80,000): Two pilot projects will involve technical assistance to stimulate private investment in improving municipal street lighting efficiency through shared savings and/or a "project finance" approach. Specifically more efficiency street lighting will be demonstrated in these two cases with substitution of high pressure sodium for mercury vapor lamps and improved control and management. The project will support feasibility assessment, creating a baseline data base, metering, project financing and ESCO contracting, evaluation of alternative financing mechanisms, liaison with CONELEC regarding management of shared saving

payments, and evaluation of results and finally, dissemination.

3. Commercial, Tourism and Government Facilities Efficiency (US$596,000 including TA for US$175,000): This pilot project provides technical assistance to stimulate the ESCO market in these sectors. Hotels, commercial establishments and government facilities will be targeted for cost-shared energy efficiency audit studies with direct ESCO participation. The project will: (i) provide technical assistance and related training; (ii) assist in defining financing options and assist in financial negotiations; and (iii) assist in dissemination of results through workshops.

4. Private Sector/Industrial-Commercial Associations "Strategic Partnerships" (US$1,881,000 including TA for US$200,000). This pilot activity will target at least one industrial and one commercial association, one combined association (e.g. exporters, small & medium enterprises, etc.) respectively, and is intended to assist: (i) design and implementation of energy efficiency programs; (ii) support sector specific technical assistance and energy efficiency training; (iii) cost-shared energy audit service; (iv) facilitate access to international best practices in production process and energy efficiency; and (v) disseminate results and promote replication.

5. The project will finance measuring and other equipment to support the evaluation and monitoring of the above demonstration projects (US$150,000).

5. Monitoring and Evaluation US$75,000 Development of a monitoring and evaluation plan including establishing baseline, defining parameters to be monitored, criteria for evaluation, data base requirements and post-project survey requirements and schedule.

6. Component Management US$210,000 Development of plan for management and control by the Project Coordination Unit (PCU), including staffing requirements and acquisition of office equipment for the PCU.

Baseline Scenario Rural Electrification

CONELEC has prepared a 2000-2009 National Electrification Plan which intends to extend coverage to an additional 750,000 households, at a cost of about $537 million of which the GOE contribution through FERUM is estimated at US$400 million (according to CONELEC's recent National Electrification Plan). The average cost per household connection was estimated at US$361 in 2001 (latest approvals for 2001 average only US$77 per household), growing to US$824 in 2009. (Source: Anexo 7.06, "Planes de Electricación Rural y Urbano Marginal", Plan de Electrificación 2000-2009, CONELEC. These plans would increase coverage to 98% of the urban population and 65% of the rural population (or about 85% of the total population).

Distribution companies privatization is expected in late 2001, and these would have the primary responsibility for grid extension electrification under this program, with the GOE through FERUM providing about 80% of the financing required. Under these plans, most of the rural population in dispersed and/or remote areas is expected to remain unserved with conventional electric power supply.

The large majority of the rural consumers to be connected through GOE and distribution utility efforts in grid extension are in the 3 distributor concession areas of Ambato (Area: 40,969 sq.km.: Provinces Tungurahua, Pastaza, Napo, Morona Santiago), Sucumbios (Area: 37,959 sq.km.: Provinces Sucumbios, Napo, Francisco de Orellana) and Centro Sur (Area: 30,364 sq.km.: Provinces Azuay, Canar, Morona Santiago). Distribution utilities generally must connect any consumer requesting service of less than 10

kW at a distance not to exceed 200 meters. Otherwise connections are made only for "projects" where FERUM or a project sponsor subsidizes construction costs sufficiently to permit the local distribution company to earn its normal rate of return on this project. Assets subsidized by FERUM are converted into shares in the distribution under the national solidarity fund.

The cost/benefit analysis of electrification and selection of projects is accomplished under FERUM guidelines by CONELEC. These guidelines are weighted to favor frontier areas, Amazon and the Galápagos (20 of 100 pts). Some extra weight (5 pts.) is given to renewable resources uses, however given the absolute financial limitation of FERUM of US$590 maximum per household, it is unclear if isolated household projects such as PV projects will be of sufficient priority or low enough in cost to qualify for FERUM financing in the near future. CONELEC furthermore, has a substantial inventory of project proposals which involve grid connection of rural areas at relatively low costs, which will compete for available funds. No other regular funding is currently available from GOE sources for electrification. Other social funds from the national solidarity fund (those not derived from fees on the electricity sector), are dedicated to non-energy social infrastructure investments.

Under the Baseline Scenario, rural electrification support will continue to go largely for rural grid extension. The only significant initiative dedicated to off-grid electrification will be the CAF project under MEM which will provide $1.9 million for public service systems (US$1.0 million) and small hydro (US$0.9 million). Even in the CAF case, sustainability is a serious issue without support from the GEF Alternative to provide technical assistance. Small renewable energy firms will continue to lack the initial market to extend sales and maintenance support except to urban or high margin specialized end uses (e.g. military, petroleum and communications). New technology such as wind and pico hydro would not be introduced nor proven cost-effective, nor have commercial support networks developed in-country.

GEF Rural Electrification Alternative

The GEF Alternative is complementary and logical extension to the existing rural electrification program which is largely for grid extension and managed by CONELEC with FERUM funding. The GEF focus will be on dispersed and remote households, and small remote commercial and public service electrification. The GEF Alternative will be coordinated with other rural development infrastructure and poverty reduction programs, including rural telephony and the PROLOCAL program funded by the World Bank which will work in 50 of the poorest cantons over a 5 year period beginning in January 2001. This coordination should produce substantial synergy in capacity building, effectiveness of dissemination and sustainability. Financing vehicles developed within PROLOCAL may also be useful for financing and/or collecting O&M contributions of electrified households.

Some US$1.0 million in funding has recently been made available for initial efforts to install PV systems in public services in remote frontier and Amazonian regions (Corporación Andina de Fomento (CAF). Several proposals exist for additional PV/renewables efforts, a proposed program for diesel conversion in the Galapagos has been prepared, and MEM is working hard to keep up with the needs being identified. ODEPLAN reported a potential rural electrification initiative under the management of the Ministry of Defense which involves plans for the provision of electrification through PV installations in the frontier areas of Peru. Any such plan would need to be designed and implemented in a manner consistent with, and complementary to, the GEF Alternative in order not to risk a making both inefficient and potentially degrading the effectiveness of the GEF approach.

Rural and dispersed/isolated households in Ecuador currently use low quality and relatively expensive alternatives to electricity. Families use "kerosene" (actually a mix of diesel and gasoline), candles and

batteries. It is currently uncertain what types of fuels are most common and level of fuel costs. Preliminary field visits as part of appraisal indicated expenditures on the order of US$4-6/month/household in the Amazon region, US$4-8 in the Sierra and US$7-10 in the Coastal zone. Available information indicates the likelihood that capital subsidies for electrification will be needed, but the amounts remain difficult to determine.

Strategic Program Design Considerations High levels of poverty in many unelectrified rural areas in Ecuador argues for an approach to electrification carefully targeted to local priorities, essential public services and sustainability. Key characteristics of the program should be:

- Local development and community priorities (beneficiary consultation) should determine how to electrify and the type and cost of systems chosen, and community participation should be maximized to low costs.
- In addition to household lighting, productive end uses should be targeted which contribute the most to critical development needs, for example: potable water supply, improved education, health care, employment and income generation and social communication.
- Target area selection should be based on objective criteria (number of population served, community interest, user willingness to support, availability of complementary social infrastructure -schools, clinics, water sources..).
- Support for initiating concessions should be based on market information indicating a substantial likelihood of sufficient demand and willingness to pay to ensure sustainability, that is, with a potential for post-GEF project market expansion and smaller and declining O&M subsidies.
- Subsidies need to be minimized, for example, by selecting appropriate systems (size, cost) for different market segments, and better understanding ability and willingness to pay.

Service Delivery Models for Off-Grid Electrification A considerable body of experience now exists with different service models, including concession (e.g. distribution utility), subconcession (e.g. delated responsibility to community or NGO within utility concession area), cooperative or community based electrification (e.g. may be in a concession or subconcession arrangement), decentralized market approaches (e.g. direct sales by dealers usually limited to high value uses and higher income households), direct government or donor led projects (e.g. grants and donations without clear plan for sustaining systems) or integrated rural development electrification (e.g. often subsidized grid extension). There is no clear best approach. The appropriate mechanisms require thorough assessment of local conditions and tailoring to the local situation. The pilot projects proposed are intended to assess likely alternatives which may be appropriate in Ecuador.

The proposed pilot projects describe two main complementary approaches for off-grid electrification. In higher potential areas, a concession approach based either on the distribution utility or an alternative private sector concessionaire is potentially viable and administratively feasible. This would be implemented in a manner designed to minimize subsidies and create a sufficient flow of funds to cover O&M costs at a minimum, and create potential for expansion to make this an attractive market for the concessionaire. The project will also complement development of complementary business activities such as supply of telephone services.

Another off-grid pilot will be designed to be compatible with the potentially very low ability of the population to pay in many rural areas. The project will emphasize support to public service facilities such as schools and hospitals, as well as community centers. This support is intended to be a most cost-effective means to improve the standard of living for the most rural residents, and at the same time achieve financial

sustainability in O&M terms. Costs will be reduced by choosing the most appropriate and least cost technology. Local benefits will be maximized by recognizing and adopting local priorities for supporting productive activities and providing technical support and training to make equipment and administrative systems self-sustaining.

GEF Off-Grid Electrification Alternative

GEF Alternative

The following outlines the major elements of the GEF Alternative off-grid rural electrification support for Ecuador, to be implemented with MEM/DEREE and CONELEC (estimated costs without taxes).

1. National Electrification Plan. US$460,000 Development of a National Electrification Plan and implementation strategy will be supported by the project in order to provide a sound legal, institutional and analytical basis for planning, implementation and financing of rural electrification. While the emphasis of the plan will be on the off-grid systems under the GEF Alternative, it is essential that the plan be comprehensive in order to integrate and coordinate all rural electrification planning. The plan will provide an improved basis for financial and economic analysis of off-grid projects, as well as a clearer framework for project development. It will also clarify and improve the linkage with distribution utility planning and investments, and related national targets for grid and off-grid rural electrification. The plan among other outputs will support:

a. Development of planning capacity by training staff and obtaining and implementing GIS computer software for development of a analysis system and data base on sites and characteristics for rural electric systems, incorporating census information and market study data, and capacity for evaluation of prospective projects. Criteria for, and preliminary definition of grid extension and off-grid project areas will be produced.
b. Analysis of the legal, regulatory and institutional structure and constraints for rural electrification, including recommending options for improvement.
c. Analysis of the rural electrification market (with surveys and data base developed separately), ability and willingness to pay for energy services, and appropriate subsidy and tariff policy.
d. Analysis and proposed clarification of distribution concession responsibilities and role in future rural electrification.
e. Development of a long-term budget and funding strategy for off-grid electrification.

2. Rural Electrification Analysis and Implementation Support. US$222,000 The project will:

a. Assist in establishing standards for user fees (tariffs) and financial cost recovery, cost-sharing (e.g. by private concessionaires and communities) and O&M financing objectives for pilot and other projects.
b. Identify and evaluate potential institutional mechanisms for pilot projects, analyze and assist in tailoring institutional arrangements for pilot projects and for replication, e.g. sub-concessions, private fee-for-service, community/NGO and development project cooperative ventures.
c. Define renewable energy industry and project training requirements and plans to address these (see below)
d. Establish linkages with other rural service and infrastructure delivery investments and programs such as roads, telephones, health and education.
e. Support establishing the necessary monitoring and evaluation criteria for pilot projects.
f. Identify and evaluate productive use options.

3. Rural Electrification Project Promotion and Capacity Development US$350,000 Promotion and capacity development is designed to both assist pilot projects and to undertake implementation the

national off-electrification program. Lessons learned from implementation of the pilots as well as results of the National Plan and Strategy will provide direction for this support. Assistance will be provided to:

a. Promote project development, including concession, community/NGO/development program and ethnic organization projects for off-grid electrification
b. Provide training to improve the institutional capacity of MEM, CONAM and other implementing partners to support overall institutional development.
c. Coordinate and promote distribution utility involvement
d. Identify, screen and promote participation of private entrepreneurs including joint electricity/telephone joint-venture
e. Assist in preparation of operationally and financially sound implementation and operation plans
f. Assist in review and approval process
g. Provide end user information and training on system limitations, proper use and basic end user maintenance.
h. Provide financial and managerial training, e.g. in bookkeeping, billing and customer service
i. Assist in preliminary financial feasibility analysis
j. Promote productive uses of electricity

4. *Rural Electrification Technical Implementation Support. US$303,000* Support again in this case will initially be focused on pilot projects, but will expand beyond these as the pilots are implemented. Specifically support will include:

a. Determining appropriate type, scale and design of rural electric systems including household, community and isolated mini-grids and assistance for specific projects or sites; as well as, supporting additional renewable resources assessments as required.
b. Designing renewable energy systems including specifications and estimated costs appropriate to resources and project market.
c. Estimate financing needs, and appropriate in-kind contributions and determine cost-sharing for private participation.
d. Establish standards for participating equipment and pre-qualify vendors.
e. Provide technical training on installation, operation and maintenance of rural electric systems.
f. Devise battery recycling and/or disposal plan and vendor requirements; assess watershed and soil structure impacts and mitigation plans for micro-hydro systems, and sustainability and environmental impact of any biomass systems.
g. Establish operating standards and regulatory procedures including technical and management capacity,
h. Special studies for critical constraints removal: For example, a s*mall-hydro private power constraints study* is planned for barrier identification, followed by technical, legal and regulatory assistance in constraint resolution. Key constraints include: developing economic tariff agreements, addressing financial guarantee requirements, determining economic value of new hydro in the national grid (SIN) and negotiating with regards this valuation (due to drought, seasonality and related considerations). Local developers appear to have both the technical capacity and financial resources (and available foreign developer/financial relationships) to develop these projects when these constraints are addressed.

5. Demonstration Projects - Design, Implementation, Evaluation and Replication US*$145,000* The overall project is designed to both support pilot projects and initiate a national off-grid electrification program. Funded in this task area are specialized services required for pilot implementation, supplementary project specific training, and hardware acquisition and installation. Implementation support will include:

a. Review and selection of projects based on objective evaluation criteria (e.g. financial soundness, cost-effectiveness, local labor and financial contribution, adequacy of local market, competence of

management plan and organization….). Although selection criteria and objectives will differ, the activity will need to be coordinated with CONAM and FERUM activities for consistency. Pilots are intended to stimulate market mechanisms and private sector participation, as well as to ensure consultation and involvement of non-governmental, community and other interested stakeholders for their implementation.

b. Preparation of agreements and contracts with project concessionaires or other sponsors (e.g. to establish financial, management, maintenance and monitoring and reporting requirements; as well as MEM and vendor responsibilities for support).
c. Assistance and coordination with CONAM in preparation of bid documents and procurement.
d. Assistance in logistics of materials acquisition, delivery, installation, commissioning, warranty administration, and end user support such as through consumer informational materials and training.
e. Monitoring of project implementation at every stage
f. Establishing and carrying out a monitoring and evaluation program consistence with the overall project plan.

Pilot Projects:
(1) *Rural Dispersed Population -- "Sub-Concession" Pilot. US$1,500,000* This pilot will consist of a number of site specific projects in different areas designed to test the feasibility and effectiveness of moderate sized rural "concession" or concession-like agreements, for planning, installation, maintenance, financial administration and local replication/expansion, of primarily household off-grid electrification systems. These may be developed: (i) cooperatively with distribution utilities as "sub-concessions" with local management or under contractual agreements for utility oversight and participation; (ii) under independent concession agreements with communities, NGO's, ethnic organizations and/or other development programs, and/or (iii) with private project developers or fee for service providers who undertake to administer and co-finance projects.

Technology: Typically the projects are expected to involve dispersed PV, wind or small-hydro installations, including potentially mini-grids, serving public service, household and productive end uses in medium to high potential zones.

Outputs: The pilots are designed to demonstrate a sustainable as well as replicable institutional mechanism for project financial administration and project O&M, to demonstrate sound technical performance and reliability, to meet consumers expectations, and to provide socio-economic benefits to end users. Pilots are intended to recover at least O&M costs from basic systems, and for larger household systems should recover capital cost subsidies (to be determined on the basis of ability to pay and willingness to pay as determined by market studies).

(2) *Public Sector Infrastructure Pilot.* *Cost US$350,000* This pilot project will demonstrate the sustainability and technical viability of dispersed (off-grid) electrification in areas with lower socio-economic capacity. Electrification support will involve energy supply for needed public services, for example – in health clinics, schools, community centers and for telecommunications, as well as in very small home lighting systems. Selected community or ethics organizations, NGOs or other development organizations, RET suppliers or project developers, electric utilities, or other representing communities will be invited to participate. The project will perform a preliminary screening, and assist those selected to prepare proposals. Selection will stress: demonstrated market and socio-economic benefit, quality of organization and management capacity, adequacy of local contribution in-kind or cash, mechanism for covering O&M costs of the systems, potential for replication of the pilot project in other provinces of Ecuador and cost-effectiveness of approach.

Technology. Installations are expected to involve dispersed PV, and/or wind or small-hydro installations, including potentially mini-grids, serving public services including school, health clinics, community centers, and telephone centers, and potentially some productive uses.

Outputs:
Direct. These pilots are designed to demonstrate a sustainable as well as replicable approach for project identification, organization, financial administration and O&M; and to demonstrate sound technical performance and reliability, meet community expectations, and to provide socio-economic benefits to the community. Potential directly financed installations include 100 schools, community centers and/or health centers, including participation in selected telecenters in villages and towns of the north and south border areas, the Amazones and other zones (some 40 planned in telecom component of project).

Indirect. The pilot will be coordinated with, and provide technical support to the Ministry of Energy and Mines social service electrification project. The MEM project is supported by the Corporacion Andina de Fomento (CAF) with US$1.9 million for off-grid renewable energy-based electrification. It is intended to electrify some 400 schools and 97 dispensaries (sanitary posts). Of these funds, US$1 million is allocated for PV systems (with an additional contribution of 300000 USD from Petroecuador), and the remaining US$900,000 has been allocated for micro-hydro schemes.

6. Monitoring and Evaluation US$25,000 Consultant Development of a monitoring and evaluation plan including establishing baseline, defining parameters to be monitored, criteria for evaluation, data base requirements and post-project survey requirements and schedule.

7. Component Administration US$250,000 Development of plan for management and control by the Project Coordination Unit (PCU), including staffing requirements and acquisition of office equipment for the PCU.

Table 7a. Incremental Costs and Benefits Matrix - Energy Efficiency

	Baseline	**Alternative**	**Increment**
Global Environmental Benefit		Barriers reduced or eliminated Reduced CO_2 emissions compared with forecast Creation of sustainable EE programs in private sector (end users) , distribution utilities and ESCOs.	Reduced or eliminated barriers Reduced CO_2 emissions (2,154,260 tons) by 10th year. Additional viable EE measures which can be replicated in region
Domestic Benefit	Use of electricity and fuels as forecasted Current level of electricity services	Reduction in the use of energy and corresponding costs savings compared to forecast Improved level of productivity, competitiveness & improved energy services Development of energy services companies	$42.8 million NPV of net benefits over 10 years. . Increased productivity and expanded sales.

Energy Efficiency	US$000	US$000	US$000
1. Constraints and Opportunities, Market and Load Studies and Economic Analysis	50	357	307 (230 GEF)
2. Efficiency Training, Technical Assistance and ESCO Support	100	560	460 (345)
3. Information, Motivation and Standards and Norms	50	212	162 (122)
4. Pilot Proj. & Demonstrations		580	580 (435)
TA		150	150 (38)
Equipment		4,992	4,992 (0)
Privet investment		75	75 (56)
5. Monitoring and Evaluation	50	260	210 (0)
6. Component Administration	250	7,186	6,936
Total			
GOE financing	250		210
WB loan			508
GEF financing			1,226
Private Investment			4,992

Table 7b. Incremental Costs and Benefits Matrix - Rural Electrification

	Baseline	**Alternative**	**Increment**
Global Environmental Benefit		Barriers reduced or eliminated Reduced CO_2 emissions compared with forecast Creation of sustainable RE with renewable energy	Reduced or eliminated barriers Reduced CO_2 emissions (192,400 tons) cumulatively at project end
Domestic Benefit	Electrification through grid connection as forecast only.	Expansion of electrification to isolated and dispersed households Increased use of renewable resources at lower cost Development of local enterprises and employment	Electrification of 3,950 households, and 100 public services. Increased quality of lighting and quality of life, improved educational opportunity, health services and increased productivity of commercial activities.
Costs *	US$000	US$000	US$000
1. National rural electrification plan/strategy and constraints resolution	36	497	461 (346 GEF)
2. Rural electrification market studies and implementation support	50	272	222 (167)
3. Rural electrification promotion and capacity development	50	400	350 (263)
4. Technical support		303	303 (227)
5. Demonstration projects	50	195	145 (109)
- Implementation support		1,850	1,850 (463)
- Projects	1,900	1,900	0
- CAF public service PV & small hydro	50	100	50 (38)
6. Monitoring & evaluation	100	400	300 (0)
7. Administration	2,236	5,917	3,681
Subtotal			
GOE financing	2,236		300
WB loan			1,768
GEF financing			1,613

Attachment 1: GEF Alternative Characteristics and Assumptions

Energy Efficiency Alternative The economic cost benefit analysis for this alternative are based on the implementation of 7 efficiency pilot activities measures plus related project replication. We recognize that it is infeasible to separate these impacts from the impacts of higher energy prices. However, it is clear from an evaluation of current institutional conditions, technical capacity, lack of efficient equipment and equipment efficiency standards in the market, past practices and information availability, as well as general attitudes toward energy use, that a substantial intervention will be necessary to realize the potential for energy efficiency in the Ecuador.

The strategy and task details of this program are discussed above. The specific efficiency measures whose impacts produce project benefits in the analysis above are:

1. Household compact fluorescent lighting program
   Lighting is estimated to account for 18% of end use electricity consumption in the residential sector. An average total consumption of 1,904 kWh/yr in year 1 grows to 2,220 in year 10. Penetration of CFLs starts at 0.1% in year 1, reaches 11.9% in year 10. The average savings per household is estimated at 138.6 kWh/year. Assumed peak coincidence of load is 40% in the cases when this effect is introduced.

2. Commercial, Tourism and Government Energy Efficiency
   Commercial lighting is estimated to account for 40% of total consumption of the commercial sector. Average total use per consumer is 10,445 kWh/year. Savings are 1,530 kWh/year per efficiency case user from a combination of lighting and other measures which are assumed to be the result of improved energy management, lighting control, and efficiency lighting retrofits. Penetration starts at 0.2 % and grow to 4.6% in year 10.

3. Municipal Street Lighting Improvement
   This end use is estimated to account for 999 GWh of electricity use in year 1 (2002), or 1,540 kWh/unit/year. Unit savings are 317 kWh/unit/year. Penetration begins at 2%, reaches 13.9% in year 10.

4. Industrial efficiency program / Strategic Partnerships
   Motors are estimated to account for 80% of end use in this sector. Electricity use totals 100,451 kWh/year per user. Unit savings would be 7.5% from the introduction of efficient motor systems, and other measures including improved lighting, load control and overall improved energy management. Penetration starts at 0.5% of this end use, and reaches 7.5% in year 10. A field visit to a textile factory in Quito known for undertaking a substantial program to improve energy efficiency indicated that other significant savings are feasible. This including boiler and steam system improvements and most importantly introduction of improvement process equipment which contributes to both productivity improvement and major electricity savings. In order to reflect the potential benefits of non-electricity energy efficiency and related waste management reductions, estimates were made of the potential fuel savings from modest introduction of efficiency measures, including such as good housekeeping, boiler tune-up, steam system improvements, process control, waste heat recovery and others. Assuming a 15% reduction in fuel use, and penetration of 0.1% in year 1 rising to 3.5% in year 10; savings were estimated and included in project totals including in CO2 emissions reductions.

The 1994 study, "Programa de Administración de la Demanda y Uso Racional de Energía Eléctrica en el Ecuador," done for INECEL provides specific information on the energy use and load characteristics for electricity end users in Ecuador, as well as energy efficiency impact information from various international studies and experiences. The study provided end use specific savings estimates and cost information for Ecuador, and relates experience in North American utilities as a basis for estimates of potential impact. A 1984-1986 energy efficiency program of INE in Ecuador supported energy audits and limited training and technical assistance. A later survey of 33 companies receiving assistance under the program indicated that some 53% of projects with costs less than $50,000 and paybacks of less than 1 year were implemented, 46% for projects with costs over $50,000. The projects with highest rates of implementation were maintenance, combustion control, insulation, power factor correction and lighting improvement. Electricity efficiency improvements were the smallest share of projects implemented due primarily to low prices for electricity. (Source: RCG/Hagler, Bailly, Inc., "Energy Conservation Investment Decision-making in Developing Countries," December 1989, pg. 3.17-3.20).

Demand-side Management Demand-side management (DSM) is another specific programmatic option for introducing both general efficiency improvements and for optimizing the utilization and operation of the power generation system through load management. Incorporating DSM programs within the utility system at this time is particularly timely given the impending privatization of the distribution utilities as part of power sector reform. DSM incentives in a vertically disaggregated utility system however will require design tailored consideration to ensure that incentives and regulations both permit and encourage this practice. While not specifically addressed in this document, DSM program planning should also introduce and incorporate the concept of "integrated resource planning" (IRP). Integrated resource planning in essence is a system-wide cost-benefit analysis that allows efficiency and environmental benefits to be more effectively compared with supply alternatives in a planning sense. In order to both design and justify DSM it is important to recognize not only the end user and distribution direct benefits, but also the system-wide benefits in terms of reduced capacity needs, reduced emissions of CO_2 and other contaminants, and lowered generation costs. In order to make estimates of these benefits and to incorporate these in the cost-benefit analysis, and corresponding levels of incentives, IRP-type analysis should be performed.

Examples of DSM opportunities are the following:

a. Households: Compact fluorescent lighting, electric heater cycling and solar hot water, energy efficiency refrigeration, and consumer education
b. Commercial/buildings: Tariff incentives/design and energy efficient lighting, efficient A/C-A/C cycling, building design practices (passive lighting, ventilations, etc.); and associated training and information.
c. Industrial: DSM - Tariff incentives/design coupled with, e.g. process control, power factor correction, efficient motors - variable speed, drive belts…, interruptible loads, process or A/C cycling. Efficiency improvements in pumps, fans, compressor selection; motor replacement, sizing and selection, belt drive; refrigeration efficiency; compressed air system management and efficiency, process efficiency improvement (boilers, kilns, furnaces, dryers, steam not primarily electrical efficiency technology but may be more effective to combine]; and associated industrial training and information.
d. Public sector: Street lighting, buildings (as in commercial above), water treatment and pumping.
e. Agricultural: Pumping and irrigation

ESCOs Ecuador has at least 3 companies which are pursuing energy service business opportunities. Two

of these firms were interviewed for this report. One is strictly a service company, staffed on a part-time basis, and the other is involved in both energy service consulting and sales of efficiency equipment. The small size of the current market, small size of these firms, limited technical capacity, concentration on only electricity efficiency, and lack of shared-savings experience, will require substantial support and market enhancement to allow these firms to grow. Particularly important will be support regarding shared savings contracting, financing, partnering with international ESCOs for business and technical support or joint ventures. There are substantial opportunities for developing linkages between such firms and the distribution utilities as these latter develop programs for DSM and efficiency.

Off-grid Electrification

For cost and benefit analysis we have made estimates of the potential market for off-grid electrification, segregating markets into more and less densely populated provincial areas, respectively. These appear to be generally reflective of their characteristics in terms of access to grid electricity, rates of poverty and rates of out migration. ODEPLAN ("Atlas para el Desarrollo Local) information by province and canton was used in interpreting this information (derived from the 1990 Census and other sources). We also utilized the World Bank report, "Ecuador: Crisis, Poverty and Social Services," June 2000, to evaluate the economic potential of households, and the availability of infrastructure in general.

Given the prospectively very low income of the off-grid population, we have chosen several types of domestic off-grid electricity systems, a 50 W PV system, 100 W PV system, and 250 W PV systems and 240 W wind and 200 W pico hydro, primarily for residential uses in higher potential - higher income areas; and a solar lantern, 240 W PV school system and 880 W PV health clinic system, for lower income areas. The pilot project installations are directly related in number to the available capital from project sources, plus significant user contributions for larger systems. Generally we consider that the O&M costs of all systems must be supportable by the users or community in the case of public service systems. Induced impacts are assumed in subsequent years as a result of project promotion and technical assistance, as well as through financing and government support which follows from the development of a national strategy. Local prices for PV equipment and costs for O&M should decrease given the capacity development and procurement of the project, however no estimates were available for the purposes of the PAD. These estimated market penetrations give a total of 2,850 concession related systems, plus 1100 individual user solar lantern systems, and 100 public service systems. The specific strategy and programmatic task characteristics of this alternative are described in detail in the programmatic discussions above.

Key assumptions affecting cost benefit analyses are:

1. Life-cycle costs: Basic residential system cost estimates are based on MEM capital cost estimates and adjusted with PAD consultants figures for O&M. Lantern costs are international data from project consultants.

2. Penetration rates: Mission assumptions based on potential market and general budget parameters of the GEF Alternative. We have included an induced growth case that increases the concession systems to 5,267 systems, lanterns to 2351 and public systems to 220. Only in the case where we assume cost decreases for these systems or cost increases for alternatives, do these cases appear economically or financially attractive.

3. Benefits assumed: Benefits calculated are explained in detail in project working papers. In general the residential systems are considered substitutes for existing kerosene use, and public service systems are substituted for small-scale diesel systems serving these loads. Social benefits are not directly quantified nor included in even in economic analysis, except in the sense that greenhouse gas reductions are

quantified. The social benefits from improved lighting quality, access to communication and entertainment, are known to be very substantial and therefore would significantly affect results. No quantitative estimates for these values are available for Ecuador. Recent World Bank sponsored research in the Philippines, for example, indicated values for less expensive improved lighting on the order of $36/month/household, as well as other benefits at least equal to this amount [World Bank-ESMAP, "Rural Electrification and Development in the Philippines," June 2001; pg. 75.]

PV systems monthly O&M Costs used for analysis purposes are as follows:

Lantern	$0.86
50 W	$3.24
100 W	$6.29
250 W	$13.06
School	$10.58
Clinic	$41.74

Table 9. Economic Lifecycle Costs of Solar Home and Public Systems - Ecuador

Solar Electric System	Installed Cost ($)	O&M & Replacement ($)	Total ($)	Full Cost Payment ($/month)
Portable lantern SHS	70	72	127	1.52
50 W SHS*	500	270	688	7.70
100 W SHS**	1050	524	1,405	16.87
250 W SHS	2,625	1,088	3,315	39.79
School (3x80W)	2,520	881	3,037	36.45
Health Center (880W)	9,240	3,478	11,355	136.28

Discount rate: 12%, Lifetime 15 years; no IVA.

Table 10. Financial Lifecycle Costs of Solar Home and Public Systems - Ecuador

Solar Electric System	Installed Cost ($)	O&M & Replacement ($)	Total ($)	Net Payment ($/month)
Portable lantern SHS	78	61	121	1.69
50 W SHS*	560	242	698	9.29
100 W SHS**	1,176	474	1,435	20.08
250 W SHS	2,940	988	3,415	47.80
School (3x80W)	2,822	810	3,159	44.21
Health Center (880W)	10,349	3,177	11,762	164.62

Discount rate: 15%, Lifetime 15 years; IVA at 12%, electricity taxes at average 30%.

Subsidy and Financial Support Policy The project is designed to promote off-grid electrification in the most financially viable means in order to present a sustainable model by covering O&M costs at a minimum, and to support replicability and expansion by setting charges to consumers in order to cover a much of capital costs as reasonable. For the smaller systems such as lanterns full costs can be covered through payments of only US$1.70/month, and for 50 W systems for about US$9.30 per month. However, this also assumes that the system is amortized over 15 years, an unlikely case for systems installed in the future in a more commercial setting. Assuming that we change the repayment period to 7 years (other things equal), the month charge to fully repay the cost of the lantern goes to US$2.34 and for the 50W system to US$12.00/month. This change is not major (about 26% for 50W), but is likely to make the systems even less affordable without an initial user subsidy. GEF subsidy is only applied to capital costs of the demonstration projects (25% of investment costs).

Generally the project considers that user subsidies should be limited to the basic systems for household use, that is, lanterns and 50 W systems, plus public service systems. For the 100 W and 250 W solar household systems, at a maximum the equivalent cost of a 50 W system may be subsidized for initial financing purposes, however with the subsidy later recovered through higher per month charges. The level of all capital subsidies should be determined in an objective fashion, and in a manner which seeks to minimize this amount to allow the overall budget to reach as many households as possible. The financial and economic analysis in the project is silent as far as this subsidy allocation. However, the implementation and ultimately the number of systems which can be supported directly by the pilot projects will depend largely on what amount of capital financing is permitted and what user connection charges are established. The PAD has not explicitly included estimates for user contributors in terms of labor and/or materials, as these were felt to be both less significant than for grid electrification and infeasible to estimate due to a lack of experience on such contributions. Substantial in-kind support however, is expected to come from ethnic, community and NGO organizations in implementing the program, as well as financial and technical support from distribution utilities and should be considered during project implementation.

Additional market studies will be needed to develop guidelines for connection charges and user subsidies, and these will determine the ultimate number of systems which the pilots will be able to finance. It should be emphasized that although larger household systems are analyzed in the PAD, that the main purpose of the project is to service lower-income rural households which grid electrification has not assisted. Larger systems for productive users likewise should be a priority, along with public service systems.

Finally, due to time constraints it was infeasible to develop a clearly articulated approach to coordinate public service electrification with the telecenters planned in the project. Nonetheless, the report has tried to make clear the synergy which exists between these two aspects of the PROMEC projects, and implementation guidelines will ensure that MEM and FODETEL coordinate closely to realize this potential

Other Renewable Energy Alternatives

The pilot projects also include wind and very small-scale hydro "pico hydro". In the case of wind estimated capital costs are US$963 installed for a 240 W system. For the small hydro a capital cost of about US$120 for a unit purchase in Vietnam is increased for transport to Ecuador, site review and installation, to a total of US$300. This latter number is uncertain given the very site specific nature of this option, and lack of experience in Ecuador.

The impacts of small-hydro in particular appear to be potentially significant due the a large number of run-of-the-river sites with substantial power potential and low-cost to develop. Local developers have

expressed substantial interest in developing this potential, as well as in rehabilitating previous projects. The constraints and issues which should be addressed to assist in realizing this potential are incorporated in the program plans described in this document. These initiatives should be equally as beneficial to potential wind electric development. It was decided to not include the impacts of policy support for the small hdyro alternative in the project cost-benefit calculations since the systems were so large they tended to overwhelm all other effects. For example, considering a base case economic NPV of -US$43,000 and EIRR of 11%; these change to NPV of US$4.5 million and EIRR of 75% if we attribute 25% of the benefit of installation of a single 200 kW hydro and a single 5 MW hydro to produce support.

CO_2 Emission Reduction Calculations In the efficiency improvement cases we have calculated emission reductions on the basis of kWhs saved and decreased generation by a marginal diesel generation plant including transmission losses of 10%; with non-electricity end uses we have used a mix of diesel and fuel oil. The marginal plant for emission calculations is always diesel. In fact in wet, dry and normal hydro years, the marginal plant remains a diesel electric unit, although efficiency would vary due to different plants being assigned the incremental load. In the wet case, some 80% of generation is by hydro, 20% thermal, of which 1.6% is diesel (fuel oil efficiency in this case is about 14 kWh/gal). In the medium case, 68.6% of generation is by hydro, 31.4% thermal of which 6.1% is diesel, and in the dry case, hydro accounts for 48% of generation and thermal 52% of which diesel is 21.9%. The plant efficiency varies due to the plants which are employed being increasingly less efficient (using year 2000 data) basis is used, that is, respectively, 15.5 kWh/gallon, 14.7 kWh/gal, and 10.1 kWh/gal of diesel. No adjustments were possible at this stage for load characteristics of end uses and end use efficiency measures. Estimated peak load demand reductions were calculated by measure, and these values and corresponding potential decreased capacity requirement benefit were incorporated in sensitivity cases in this analysis.

For rural electrification, we have assumed average consumption of "kerosene" actually a mixture of diesel and gasoline as the primary fuel for rural off-grid lighting. For public service uses the assumption is made that small diesel generation would be the alternative to rural renewable energy systems. Emission reductions calculations are based on CO_2 emissions reductions for the household sector are based on an assumed use approximately 0.84 lt/day/household (50 W PV case, increasing for larger systems). Significant lighting expenditures on candles and batteries are not directly considered. Given that the availability and quality of lighting may be very low by international standards, a major benefit of PV may be in providing a high quality lighting source rather than offsetting either expenditures or commercial fuels currently used.

Annex 5: Financial Summary

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Annex 5 - Financial Summary Ecuador PROMEC (US thousands$)					
	Implementation Period				
Project Costs	**2002**	**2003**	**2004**	**2005**	**Total**
INVESTMENT COSTS	1,511	6,080	20,324	11,957	39,871
RECURRENT COSTS	1,695	4,360	7,458	9,723	23,236
	-	-	-	-	-
1.3. CENACE	350	350	1,100	1,100	2,900
2. Extension of services	-	-	-	-	-
2.1. Telecenters	100	1,561	2,718	3,635	8,014
2.2. Rural Electrification	259	259	259	259	1,036
2.3. ICT-based BSD for MSB	867	1,711	1,779	3,787	8,143
4. Taxes	119	479	1,602	943	3,143
TOTAL PROJECT COSTS	3,206	10,440	27,781	21,680	63,107
Financing	**2002**	**2003**	**2004**	**2005**	**Total**
IBRD	871	3,507	11,724	6,897	23,000
Government (central)	255	1,026	3,428	2,017	6,726
GEF	852	852	568	568	2,839
Local Private Sector	1,112	1,975	4,706	2,658	10,450
Users Fees	116	3,081	7,356	9,540	20,092
Other	-	-	-	-	-
Total Project Financing	3,206	10,440	27,781	21,680	63,107

Annex 6: Procurement and Disbursement Arrangements

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Procurement

Proposed procurement arrangements are summarized in Tables A. and A1. Consultant services and goods & BOO contracts for World Bank financed activities would be procured, respectively, in accordance with the provisions of the World Bank guidelines for Selection and Employment of Consultants by World Bank Borrowers published in January 1977, revised in September 1977, and January 1999, and the Guidelines for Procurement under World Bank Loans and IDA Credits, published in January 1995, and revised in September 1997 and 1999. Standard bidding documents will be used for all IBRD-financed procurement.

Goods. The project would finance goods for an estimated total cost of US$10.0 million that will be procured under International Competitive Bidding (ICB) for all tenders estimated to cost the equivalent of US$250,000 or more, under National Competitive Bidding (NCB) for all tenders estimated to cost between US$50,000 and US$250,000 and under International or National Shopping for tenders estimated to cost less than US$50,000.

BOO contracts. The project would finance BOO contracts under the Rural Telecommunications component for an estimated total cost of US$6.6 million. ICB will be used for awarding these contracts to private operators that will compete on the basis of selection criteria including qualifications and minimum subsidies. There will be prequalification. These contracts will conform with Section 3.13 (a) of the Bank Guidelines. The private operators selected in this manner shall be free to procure the goods required for the facility from eligible sources, using their own procedures.

Consultants' Services and Training. Consultant and training services for an estimated total amount of US$12.3 million will be procured under contracts awarded under QCBS and other selection methods as indicated in Table A1. Consulting assignments for which a firm is to be hired and which have a value equivalent to US$100,000 or more, shall be procured according to Quality and Cost Based Selection (QCBS). The method of selection based on Consultants Qualifications (CQ) will be used for contracts with an estimated value of less than US$100,000. Individual consultants (IC) shall be selected in accordance with Section 5 of the Bank Guidelines, up to an aggregate amount of 2.53 million, mostly consultants in CONAM's UEP.

Project Implementation Unit. The *Consejo Nacional para la Modernización del Estado* (CONAM) is the implementing Government agency for this project. CONAM's Public Enterprise Reform Unit (UEP) will be responsible for central handling of project accounts and information, budgeting, preparation of financial reports, procurement procedures and contracts supervision, and establishment and operation of internal controls. Contract award will be the responsibility of CONAM's Executive Director. Agencies that participate in the project (CONELEC, CENACE and MEM for the power sector, FODETEL and SUPTEL for the telecommunications sector, MICIP for the ICT component) will be responsible for technical design and orientation of the project activities.

Procurement Capacity Assessment: The assessment of the capacity of CONAM for implementing the PROMEC project was conducted in June 2001, following a preliminary assessment in December 2000. The assessment reviewed legal aspects, organization and staffing, procurement environment, procurement cycle management, and contact monitoring. An action plan was agreed with CONAM, as follows: a/ Continue

procurement training for CONAM's and other implementing agencies' staff, in particular during the project launch workshop; b/ Publish the project's General Procurement Notice, immediately after loan approval; c/ Open a section on the project in CONAM's web page; d/ Start the creation of a consultants and suppliers data base for the project to input contracts and follow up actions; e/ Establish a computerized system for the monitoring and filing of contracts in CONAM (condition of effectiveness).

The main conclusions and agreements of the procurement capacity assessment are summarized below:

Organization and personnel: CONAM has a team of professionals that were for the most part involved in procurement processes for Bank-financed projects (PERTAL, MOSTA and PROMEC PPF). This team includes the administrative and financial director, a disbursement assistant, a procurement assistant, and three sector technical specialists (in telecommunications, electricity and privatization) for the preparation of TORs and supervision of the consultants. Nevertheless, the review of experience in the execution of the PPF has evidenced the need to hire a full time procurement specialist, and to strengthen the skills of the existing UEP procurement staff through their participation in Bank training events related to procurement procedures, prior to loan effectiveness. The other agencies that are involved in the implementation of the different components of the project (CONELEC, MEM, CONATEL, SUPTEL and CENACE) have the necessary experience to elaborate TORs and supervise complex consulting services, but they are not familiarized with steps and requirements for Bank-financed activities, and training will also be necessary, prior to loan effectiveness. This should allow avoiding delays that often happens at the onset of projects, because of the time required for project staff to become familiarized with Bank's procurement procedures. The review also confirmed that there was good collaboration between the technical staff of the various agencies and that of CONAM.

Procedures. CONAM has prepared a project Operations Manual (OM) that specifies detailed responsibilities, procedures and internal controls for procurement activities, including a detailed flow of actions regarding bid/proposal evaluation, contract award and communications with the Bank. The OM also includes job descriptions for procurement-related staff at CONAM. However, there is a risk of insufficient coordination between CONAM and the participating agencies. To mitigate this risk, adequate procedures will be defined in the Operations Manual, as well as within the subsidiary agreements to be passed between CONAM and the participating agencies. The OM will also establish standards for time allowed for the preparation and review of procurement documentation and project outputs by all concerned parties. Each participating agency will designate a project coordinator, with clearly defined responsibilities and work program. CONAM will organize meetings on a regular basis to coordinate and plan procurement activities with the participating agencies.

Legal aspects. As indicated in the Country Procurement Assessment for Ecuador undertaken in 2000, some of the national laws and regulations concerning procurement procedures are not consistent with the Bank's guidelines. This problem will be addressed through the introduction of special clauses in the Loan Agreement. CONAM will be responsible for all clearances in the country with respect to any procurement of goods, and any employment of consultants to be financed out of the proceeds of the Loan, any approval of bidding documents or requests of proposals or contracts required under the laws of the Borrower. FODETEL's regulations for the selection of private operators for rural telecommunications depart from Bank rules on two aspects: (i) selection is based on a two-envelope system; and (ii) there is no prequalification phase. This problem will also be addressed through the introduction of clauses in the procurement schedule of the Loan Agreement and GEF Grant Agreement to prevent using the two-envelope system, but to allow prequalification of operators. These aspects were discussed with FODETEL.

Procurement environment. Procurement culture in Ecuador appears more developed than in earlier projects financed by the Bank, although many instances of corruption have been publicly reported at national level. In the discussions sustained for this assessment, it was confirmed that present authorities at CONAM and the UEP have a strong will for ethical behavior and have expressed their commitment to adhere to competitive selection and transparency in all activities. The Bank should continue to support CONAM by providing thorough, consistent and prompt advice on procurement activities and issues. To further increase transparency, CONAM will post on its web page, information on bidding processes, short lists, specifications and terms of reference. In addition, independent professionals will participate in key procurement stages such as short listing and bid evaluation.

Procurement planning and monitoring. CONAM has prepared a procurement plan that forms part of the Project Implementation Plan (PIP). The PIP will be finalized during negotiations. It will include a detailed procurement plan for the first year of project execution. The procurement plan should be reviewed and updated before the end of each calendar year, in order to adequately plan for publication of notices, preparation of bidding documents and necessary inputs of participating agencies for the following year. The Procurement plan would also be updated on a quarterly basis (including initial and actual dates for key procurement stages), as a management tool to ensure timely and efficient delivery of outputs as scheduled in the plan. This should avoid unrealistic planning of procurement schedules and delays in the implementation of the various stages of the process. CONAM and the participating agencies have started preparing the procurement documents for the first year of implementation of the project. CONAM will form ad-hoc evaluation committees to review expressions of interest and evaluate bids. The committees will include three to four representatives from CONAM, relevant participating agencies and independent professionals, as well as CONAM's procurement specialist.

GPN. A General Procurement Notice will be published, following loan approval, in Development Business and the national press. Non confidential procurement information will be posted on CONAM's web page. Specific procurement notices will be published as per Bank guidelines.

Contract monitoring and filing. CONAM, as the rest of government entities in Ecuador, does not have mandatory requirements to keep detailed procurement records. However, it has been agreed that CONAM will establish such a record and monitoring system for the project contracts, as a condition of loan effectiveness. Initial Bank supervision missions should review and validate this system. Furthermore, CONAM, in collaboration with the participating agencies, will establish, maintain and update a consultants' and suppliers' data base compiled from expressions of interest and specialized sources, according to profiles of services and goods needed in PROMEC. This database would be a tool to support quality, availability and transparency for a competitive selection of consultants and procurement of goods.

Procurement methods (Table A)

Table A: Project Costs by Procurement Arrangements
(US$ million equivalent)

Expenditure Category	Procurement Method[1]				Total Cost
	ICB	NCB	Other[2]	N.B.F.	
1. Works	0.00	0.00	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

2. Goods	16.85 (10.86)	0.43 (0.35)	0.51 (0.42)	6.60 (0.00)	24.39 (11.63)
3. Services	0.00 (0.00)	0.00 (0.00)	16.73 (11.37)	2.25 (0.00)	18.98 (11.37)
4. Miscellaneous	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
5. Front-end fee	0.00 (0.00)	0.00 (0.00)	0.23 (0.00)	0.00 (0.00)	0.23 (0.00)
Total	16.85 (10.86)	0.43 (0.35)	17.47 (11.79)	8.85 (0.00)	43.60 (23.00)

[1/] Figures in parenthesis are the amounts to be financed by the Bank Loan. All costs include contingencies.

[2/] Includes civil works and goods to be procured through national shopping, consulting services, services of contracted staff of the project management office, training, and technical assistance services.

Table A1: Consultant Selection Arrangements (optional)
(US$ million equivalent)

Consultant Services Expenditure Category	Selection Method							
	QCBS	QBS	SFB	LCS	CQ	Other	N.B.F.	Total Cost[1]
A. Firms	8.34	0.00	0.00	0.00	2.95	0.00	0.50	11.79
	(4.90)	(0.00)	(0.00)	(0.00)	(1.90)	(0.00)	(0.00)	(6.80)
B. Individuals	0.00	0.00	0.00	0.00	0.00	5.44	1.75	7.19
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(4.57)	(0.00)	(4.57)
Total	8.34	0.00	0.00	0.00	2.95	5.44	2.25	18.98
	(4.90)	(0.00)	(0.00)	(0.00)	(1.90)	(4.57)	(0.00)	(11.37)

1\ Including contingencies

Note: QCBS = Quality- and Cost-Based Selection
QBS = Quality-based Selection
SFB = Selection under a Fixed Budget
LCS = Least-Cost Selection
CQ = Selection Based on Consultants' Qualifications
Other = Selection of individual consultants (per Section V of Consultants Guidelines), Commercial Practices, etc.

N.B.F. = Not Bank-financed
Figures in parenthesis are the amounts to be financed by the Bank Loan.

Prior review thresholds (Table B)

Prior review of draft bidding documents, bid evaluation reports and contract award recommendation and contracts will be carried out for all ICB contracts for goods exceeding US$250,000 and for the first contract under NCB and the first contract under shopping. This will cover about 96% of the total amount of Bank-financed contracts. Selective post review will be applied to other contracts during supervision missions. Prior review of the terms of reference, cost estimates, selection criteria, consultant short lists, request for proposals, bid evaluation reports and contract award recommendation, and draft contracts will be required for all consultant contracts with an estimated cost exceeding $100,000 per contract for firms. Short list and TORs will be reviewed in the case of contracts for firms with an estimated cost of less than US$100,000. Regarding individual consultants, qualifications, experience, TORS and terms of employment will be reviewed for contracts above US$30,000 and TORS will be reviewed for contracts below US$30,000.

Table B: Thresholds for Procurement Methods and Prior Review [1]

Expenditure Category	Contract Value Threshold (US$ thousands)	Procurement Method	Contracts Subject to Prior Review
1. Works			
2. Goods	>250 50< <250 <50	ICB NCB International/National Shopping	All First one First one
3. Services Firms	>100 <100	QCBS CQ	All TORs, selection criteria and contract terms
Individuals	>30 <30		All TORs
4.Training	Same as 3	Same as 3	Same as 3
5. Miscellaneous			
6. Miscellaneous			

Total value of contracts subject to prior review: US$26 million

Overall Procurement Risk Assessment

Average

Frequency of procurement supervision missions proposed: One every 12 months (includes special procurement supervision for post-review/audits)

[1] Thresholds generally differ by country and project. Consult OD 11.04 "Review of Procurement Documentation" and contact the Regional Procurement Adviser for guidance.

Disbursement

Allocation of loan proceeds (Table C)

The Bank loan and the GEF grant will be disbursed over a period of four years. The project´s closing date is June 30, 2006, i.e. six months after the estimated project completion date.

Table C: Allocation of Loan Proceeds

Expenditure Category	Amount in US$million	Financing Percentage
Goods	10.38	100% foreign 80% local
Services, including training and audit fees	7.60	100%
PPF Refinancing	2.30	
Unallocated	2.72	
Total Project Costs Financed by IBRD Loan.	23.00	
Front-end fee	0.23	
Total	23.23	

Table C1: Allocation of GEF Grant

Expenditure Category	Amount in SDRmillion	Amount in US$million	Financing Percentage
Goods	0.35	0.44	100% foreign 80% local
Services	1.64	2.06	100%
Unallocated	0.27	0.34	
Total Project Costs financed by the GEF Grant		2.84	
Front-end fee		0.00	
Total		2.84	

Financial Management and Project Accounting

The Project Coordination Unit (PCU) within CONAM will be responsible for maintaining project management arrangements acceptable to the Bank including centralization of project accounts and information, budgeting, elaboration of financial reports, contracts supervision and establishment of internal controls. The PCU will be responsible for monitoring both Bank and counterpart project funds.

The PCU has an integrated financial system SIGEF (*Sistema de Gestión Financiera*) which would allow project management to account project expenditures and monitor process. In addition, the PCU will install, as a part of the SIGEF system, a project system to monitor the financial and physical activities of the project, by effectiveness. This project system would include planning, internal controls, project monitoring, contracts monitoring and financial reporting.

The specific functions, responsibilities and procedures of the financial management system are established and governed by the Operations Manual, that was prepared by CONAM to the Bank satisfaction.

Use of statements of expenditures (SOEs):

Disbursements against categories described in Table C and C1 would be made upon receipt by IBRD of fully documented applications, except for contracts valued at less than a)US$100,000 for consulting firms; b) at less than US$30,000 for individual consultants; c) at less than 50,000 for goods; and d) for all training costs, which would be made against statements of expenditures (SOEs). The minimum size of application for direct withdrawals and issuance of commitments would be for at least 20 percent of the Authorized Allocation to the Special Account. Supporting documents for SOE will be retained by CONAM for 1 year after in which the last disbursement takes place and would be available for review by the Bank and the auditors. Account and SOEs would be audited annually by independent auditors acceptable to the Bank.

Special account:

Two special Accounts will be established at the Central Bank in accordance with Bank policies and procedures. In the case of the special account for the Bank loan, the amount of the initial deposit will be US$1.5 million, with an initial advance of US$500,000 until the aggregate disbursed amount has reached US$4.0 million. In the case of the special account for the GEF grant, the amount of the initial deposit will be US$0.25 million, with an initial advance of US$100,000 until the aggregate disbursed amount has reached US$0.5 million. There could also be only one special Account for the loan and GEF grant. In this case, the reconciliation statement for the special Account will clearly identify the deposit under both the loan and the GEF grant.

Following 6 months of project implementation and the borrower's submission of the initial project management reports, the Bank's financial management specialist would assess the project's readiness to adopt full LACI procedures and prepare quarterly Project Management Reports. At that time, the disbursement procedures would be expected to switch to PMR based disbursement for the remainder of the project. The PMR consists of a set of agreed-upon quarterly reports, detailing historical and planned financial, physical, and procurement activities under the project, including a projection of cash requirements for two subsequent quarters.

Project Management Reports

During the project execution, the PCU will submit to the Bank semiannual project management reports linking technical activities with financial costs. After installing an integrate project financial system acceptable to the Bank, the PCU will submit to the Bank quarterly project management reports, linking project expenditures to key monitoring indicators of activities carried out during each quarter. The format and basis to produce those reports would be in accordance with he Bank Financial Management Manual and LACI procedures.

Financial Audits

The PCU would have the records and accounts of the project for each year audited by an independent and qualified external auditors firm, acceptable to the Bank. The audit would be performed in accordance with international auditing standards, and TORs satisfactory to the Bank. Copies of the audit reports would be furnished to the Bank no later then June 30 of each year.

Annex 7: Project Processing Schedule

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

Project Schedule	Planned	Actual
Time taken to prepare the project (months)	8	
First Bank mission (identification)		11/25/98
Appraisal mission departure	06/19/2001	06/19/2001
Negotiations	08/07/2001	08/09/2001
Planned Date of Effectiveness	01/01/2002	

Prepared by:

CONAM and participating agencies (CONELEC, CONATEL/FODETEL, SUPTEL, CENACE, MICIP and MEM-DEREE

Preparation assistance:

PPF-360-EC (US$2 million)
Japanese Grant (US$0.7 million)
GEF PDF (US$0.35 million)

Bank staff who worked on the project included:

Name	Speciality
Joerg-Uwe Richter	Sr. Economist, Task Manager (until 11/30/2000)
Philippe Durand	Sr. Energy Specialist, Task Manager (from 12/01/2000)
Eloy E. Vidal	Pr. Telecommunications Specialist
Alberto Cruzat	Sr. Telecommunications Specialist
Luis Carlos Guerrero	Financial Management Specialist
Livio Pino	Sr. Financial Management Specialist
Juan David Quintero	Sr. Environment Specialist
Pilar Larreamendy	Social Scientist
Susan Goldmark	Sector Manager
Kathy Bain	Sr. Social Scientist
Clemencia Torres	Regulatory Specialist
José Manuel Bassat	Communications Officer
Luiz Gazoni	Sr. Procurement Specialist
Patricia Hoyes	Financial Management specialist
Dana Rysankova	Private Sector Specialist
Lourdes Linares	Financial Management specialist
Eduardo Zolezzi	Senior Power Engineer
James C. Hanna	Private Sector Specialist
Marialisa Motta	Private Sector Specialist
Michael Goldberg	Micro Finance Specialist
Mike Jones	Consultant

Gabriela Arcos	Environmental Specialist
Issam Abousleiman	Disbursement Officer
David Varela	Senior Counsel
Macdonald Benjamin	Resident Representative
Quality Enhancement Review Team (K.Kidaresan, S.Ettinger, J.Besant-Jones, A.Revollo, S.Panneer, R.Taylor, A.Colliou, K.O'Sullivan)	

Annex 8: Documents in the Project File*

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

A. Project Implementation Plan

Project Operational Manual, August 9, 2001
Project Implementation Plan, August 9, 2001

B. Bank Staff Assessments

Aide memoire pre-appraisal mission, December 2000
Aide Memoire appraisal mission, June 2001

C. Other

- Law 184 RO/996, enacted on 10 Aug. 1992, which separated operating (EMETEL) and regulatory and control functions (SUPTEL);
- Law 94 RO/770, enacted on 30 Aug. 1995, which created new regulatory entities: CONATEL and SENATEL; and allowed privatization of EMETEL, which was split into ANDINATEL & PACIFICTEL;
- Electricity market Law of September, 1996 as amended through Law of , 1998, and attendant regulations
- Economic Transformation Law of 13 March 2000 ("Ley Trole-1") which eliminated the exclusivity concept and increased the allowable private shareholdings in ANDINATEL and PACIFICTEL from 35% to 51%
- Economic Transformation Law of August 17, 2000 ("Ley Trole-2") which increased the allowable private shareholdings in all electricity enterprises from 39% to 51%.

*Including electronic files

Annex 9: Statement of Loans and Credits

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

May-2001

Project ID	FY	Purpose	Original Amount in US$ Millions						Difference between expected and actual disbursements[a]	
			IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig	Frm Rev'd
P039437	2002	RURAL POVERTY (PROLOCAL)	25.20	0.00	0.00	0.00	0.00	25.20	0.00	0.00
P049924	2001	Rural Water Supply & Sanitation	32.00	0.00	0.00	0.00	0.00	31.15	-0.85	0.00
P064045	2000	Fin Sectr TA Ln	10.00	0.00	0.00	0.00	0.00	9.30	2.63	0.00
P070337	2000	EC-SAL	151.52	0.00	0.00	0.00	0.00	80.00	60.00	0.00
P040086	1998	INDIGENOUS PEOPLES	25.00	0.00	0.00	0.00	0.00	7.71	3.45	0.00
P040106	1998	INTL TRDE/INTEGRATIO	21.00	0.00	0.00	0.00	0.00	9.91	4.41	0.00
P007135	1998	AGRIC CENSUS & INFO	20.00	0.00	0.00	0.00	0.00	4.30	-0.83	0.00
P039084	1998	EC- HEALTH SERVICES MODERNIZATION PROJ.	45.00	0.00	0.00	0.00	0.00	37.20	15.47	0.00
P036056	1997	EC JUDICIAL REFORM	10.70	0.00	0.00	0.00	0.00	2.48	1.48	0.00
P007131	1997	AG RESEARCH	21.00	0.00	0.00	0.00	1.20	13.29	3.74	2.73
P007128	1996	ENV MANAGEMENT PROJ	15.00	0.00	0.00	0.00	4.99	1.65	6.64	3.65
		Total:	376.42	0.00	0.00	0.00	6.19	222.19	96.14	6.38

ECUADOR
STATEMENT OF IFC's
Held and Disbursed Portfolio
May-2001
In Millions US Dollars

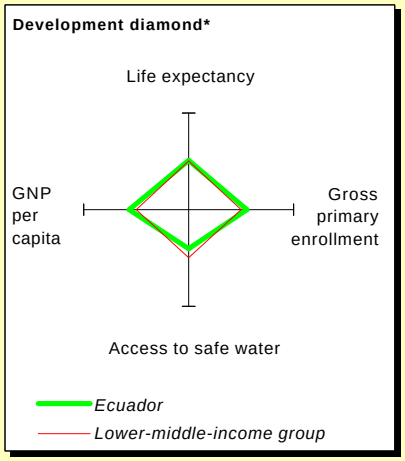
		Committed				Disbursed			
		IFC				IFC			
FY Approval	Company	Loan	Equity	Quasi	Partic	Loan	Equity	Quasi	Partic
1997	Agrocapital	3.50	0.00	0.00	0.00	3.50	0.00	0.00	0.00
1969/73/77/81/82/87	COFIEC	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1998	Concessionaria	11.50	1.30	0.00	15.00	2.93	0.33	0.00	3.82
1999	FV Ecuacobre	9.00	0.00	0.00	0.00	9.00	0.00	0.00	0.00
1998	Favorita Fruit	10.00	5.00	0.00	0.00	10.00	5.00	0.00	0.00
1999	La Universal	8.20	5.00	0.00	0.00	8.20	5.00	0.00	0.00
1993	REYBANPAC	4.65	0.00	0.00	0.00	4.65	0.00	0.00	0.00
	Total Portfolio:	46.85	11.30	0.00	15.00	38.28	10.33	0.00	3.82

		Approvals Pending Commitment			
FY Approval	Company	Loan	Equity	Quasi	Partic
2000	ERSA	8.00	4.00	0.00	0.00
	Total Pending Commitment:	8.00	4.00	0.00	0.00

Annex 10: Country at a Glance

ECUADOR: Power and Communications Sectors Modernization and Rural Services Project (PROMEC)

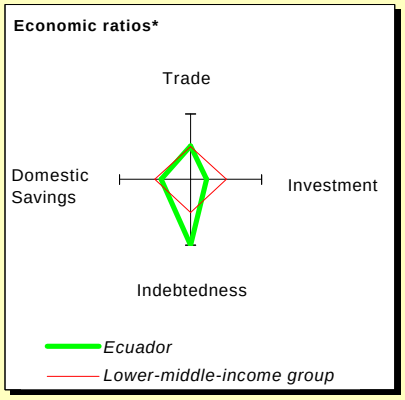
POVERTY and SOCIAL	Ecuador	Latin America & Carib.	Lower-middle-income
1999			
Population, mid-year *(millions)*	12.4	509	2,094
GNP per capita *(Atlas method, US$)*	1,360	3,840	1,200
GNP *(Atlas method, US$ billions)*	16.9	1,955	2,513
Average annual growth, 1993-99			
Population *(%)*	2.0	1.6	1.1
Labor force *(%)*	3.4	2.5	1.2
Most recent estimate (latest year available, 1993-99)			
Poverty *(% of population below national poverty line)*	35	..	..
Urban population *(% of total population)*	64	75	43
Life expectancy at birth *(years)*	70	70	69
Infant mortality *(per 1,000 live births)*	32	31	33
Child malnutrition *(% of children under 5)*	45	8	15
Access to improved water source *(% of population)*	70	75	86
Illiteracy *(% of population age 15+)*	9	12	16
Gross primary enrollment *(% of school-age population)*	127	113	114
Male	134	..	114
Female	119	..	116



KEY ECONOMIC RATIOS and LONG-TERM TRENDS

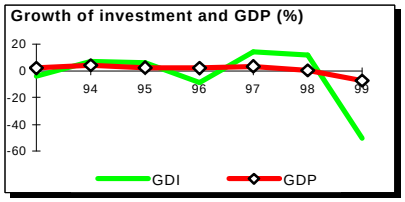
	1979	1989	1998	1999
GDP *(US$ billions)*	9.4	9.8	19.7	19.1
Gross domestic investment/GDP	25.3	20.7	24.7	12.2
Exports of goods and services/GDP	25.9	29.4	25.3	37.3
Gross domestic savings/GDP	25.9	18.9	18.0	24.9
Gross national savings/GDP	22.0	12.5	17.7	24.8
Current account balance/GDP	-4.8	-5.2	-11.0	5.0
Interest payments/GDP	2.9	4.2	3.8	3.6
Total debt/GDP	48.4	115.2	76.8	80.2
Total debt service/exports	60.1	35.6	28.8	22.8
Present value of debt/GDP	..	..	72.2	..
Present value of debt/exports	..	..	240.0	..

	1979-89	1989-99	1998	1999	1999-03
(average annual growth)					
GDP	2.0	2.4	0.4	-7.3	..
GNP per capita	-0.8	0.2	2.1	-14.4	..
Exports of goods and services	4.5	5.2	-3.8	-2.6	..

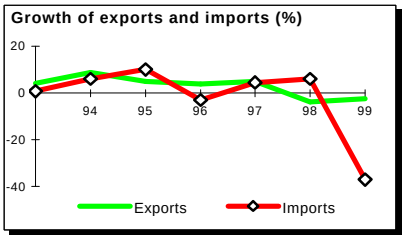


STRUCTURE of the ECONOMY

	1979	1989	1998	1999
(% of GDP)				
Agriculture	13.5	14.0	12.0	12.4
Industry	38.6	37.4	32.7	37.4
Manufacturing	19.2	21.1	21.9	21.3
Services	47.9	48.6	55.2	50.3
Private consumption	61.2	71.7	70.4	65.0
General government consumption	12.9	9.4	11.7	10.1
Imports of goods and services	25.4	31.2	32.0	24.7



	1979-89	1989-99	1998	1999
(average annual growth)				
Agriculture	4.1	2.7	-1.4	1.8
Industry	1.6	2.8	-0.6	-6.0
Manufacturing	0.5	2.4	0.4	-7.1
Services	1.6	2.0	1.8	-11.3
Private consumption	2.1	1.8	2.1	-9.5
General government consumption	-1.2	-1.2	-1.1	-12.9
Gross domestic investment	-3.5	0.4	11.8	-50.5
Imports of goods and services	-1.7	1.8	5.9	-37.0
Gross national product	1.8	2.3	4.1	-12.8

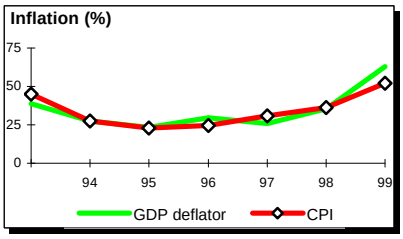


Note: 1999 data are preliminary estimates.

* The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

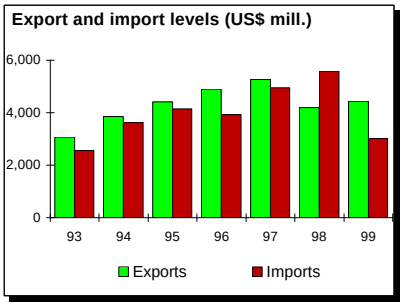
PRICES and GOVERNMENT FINANCE

	1979	1989	1998	1999
Domestic prices				
(% change)				
Consumer prices	10.3	75.6	36.1	52.3
Implicit GDP deflator	16.1	70.8	35.4	62.9
Government finance				
(% of GDP, includes current grants)				
Current revenue	..	14.8	16.2	19.3
Current budget balance	..	2.3	0.4	1.9
Overall surplus/deficit	..	1.9	-4.8	-3.4



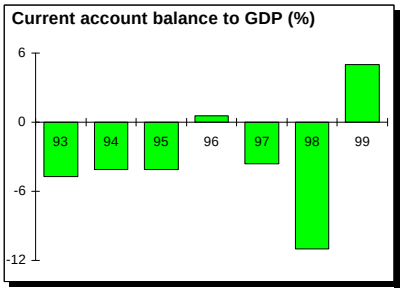
TRADE

	1979	1989	1998	1999
(US$ millions)				
Total exports (fob)	1,659	2,354	4,203	4,451
Oil	720	1,033	789	1,312
Bananas	140	370	1,070	954
Manufactures	..	328	1,004	1,062
Total imports (cif)	1,505	1,693	5,576	3,017
Food	..	..	..	..
Fuel and energy	63	66	326	244
Capital goods	544	625	1,874	815
Export price index *(1995=100)*	123	101	84	100
Import price index *(1995=100)*	93	104	91	84
Terms of trade *(1995=100)*	132	97	92	119



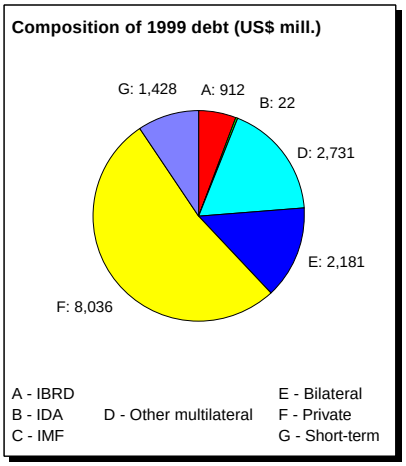
BALANCE of PAYMENTS

	1979	1989	1998	1999
(US$ millions)				
Exports of goods and services	1,838	2,871	5,007	5,263
Imports of goods and services	1,985	2,296	6,409	4,090
Resource balance	-146	575	-1,402	1,173
Net income	-337	-1,186	-1,543	-1,319
Net current transfers	31	97	776	1,101
Current account balance	-453	-514	-2,169	955
Financing items (net)	521	703	1,774	-1,294
Changes in net reserves	-68	-189	395	339
Memo:				
Reserves including gold *(US$ millions)*	740	706	1,786	1,809
Conversion rate *(DEC, local/US$)*	25.0	526.3	5,446.6	8,496.1



EXTERNAL DEBT and RESOURCE FLOWS

	1979	1989	1998	1999
(US$ millions)				
Total debt outstanding and disbursed	4,525	11,317	15,140	15,310
IBRD	85	761	854	912
IDA	37	32	23	22
Total debt service	1,121	1,029	1,706	1,475
IBRD	13	115	136	141
IDA	0	1	1	1
Composition of net resource flows				
Official grants	13	40	66	..
Official creditors	-45	186	188	205
Private creditors	618	242	-247	-30
Foreign direct investment	63	80	831	690
Portfolio equity	0	0	0	0
World Bank program				
Commitments	58	45	111	20
Disbursements	31	75	85	90
Principal repayments	6	46	84	83
Net flows	25	30	0	7
Interest payments	7	70	52	59
Net transfers	18	-40	-52	-52



Additional
Annex 11

Social and Environmental Analysis

1. Environmental Assessment for the Power Sector

This annex summarizes the main findings of an environmental overview of the legal, regulatory and institutional framework in the electricity sector in Ecuador, and of the generation and distribution companies.

The environmental overview outlines a proposal to strengthen the institutions dealing with environmental issues in the sector, including the creation of an Environmental Unit within CONELEC, and the establishment of environmental units within the companies operating in the sector. The overview proposes a training program targeting the Environmental Unit of CONELEC, the environmental units of the sector companies, and the overall assistance for the improvement of the environmental management of the sector in Ecuador. It also establishes the terms of reference for an environmental assessment of the sector, based on environmental audits of the on-going projects and on environmental impact studies, together with plans for environmental management and monitoring, for future projects.

Table 1 presents highlights the main environmental issues to be addressed in the Ecuadorian electricity sector. Table 2 outlines a program to improve the environmental management of the sector. Table 3 identifies the studies, technical assistance, implementation mechanisms and necessary equipment. Table 4 summarizes the estimated costs of implementing the proposed program.

Table No. 1
Summary of the sector's environmental issues

Main Environmental Problems	**Sectoral Environmental Strengthening Proposals**
Limited sectoral capacity to manage environmental issues.	Establishment of an environmental unitt in CONELEC. Training and procurement of appropriate Equipment.
Implementation shortcoming of the environmental norms in the sector.	Environmental protection policies, at national and sectoral levels are coherent and, in principle, could serve to guide electric sector environmental management at projects' level. However, it is necessary to strengthen an integral policy for the sector by applying instruments,--mostly economic-- which promote a cleaner production, as well as savings and efficient use of energy.
Lack of instruments for sector environmental management. Insufficient environmental guidelines. Environment liabilities of existing sector activities not fully identified Timely financing of environment liabilities remediation	It is necessary to prepare more specific guidelines for each sub-sector: hydroelectric, thermoelectric, transmission, distribution, as well as for projects in the telecommunications sector. Need to prepare specific protocols about environmental audits for the various sub-sectors. Environment audits to be conducted by privatized sector operators. Government to assign funds.
Lack of environmental data in the sector.	Creation of an environmental quality system must be created in order to evaluate atmospherical quality ("emission" levels), water quality, eventual presence of acid rain, and any other social and environmental issues.
Low level of community involvement.	Design of public participation mechanisms. Analysis of the legislation on public participation in Ecuador and other Latin American countries, as well as its applicability to environmental management of electricity. Undertake public participation workshops and public audiences.
Lack of instruments and market economic incentives for a better environmental management.	Creation of a technical and economic database on generation alternatives.

Table No. 2 Summary of programs for sectoral strengthening	
Program	**Description**
1. Establishment of an environmental unit in CONELEC.	The Environmental Unit of CONELEC, must have an appropriate structure, autonomy and responsibilities to: i) promote an integral and coherent development of the sector environmental management; ii) control and regulate compliance with environmental regulations in electric sector activities; and iii) improve decision making process within CONELEC to optimize the sustainability of the overall benefits. To this end, the Environmental Unit must be placed at a high level in the organization chart of CONELEC, with decision making power, and report to its president The Environmental Unit must be inter-disciplinary to obtain a holistic view of the social and environmental management of the electric sector. It needs professionals who can manage physical aspects such as soil stability, sanitary issues, atmospheric and water contamination etc. Issues pertaining to the natural environment must be managed by, among others, experts in ecology, vegetation, fauna, and aspects of environmental quality, protected natural areas, and bio-diversity. Social and economic experts must manage issues such as relations with communities, ethnicity, indigenous reserves, cultural and archaeological patrimony, and community consultation. An expert on environmental law will be in charge of the legal aspects. It is also important to organize a research group to handle the databases on environmental data, clean technologies and renewable energy.
Instruments for implementation.	Adequate funding for the Environmental Unit will be provided to ensure efficient operation of the Department. Appropriate equipment fitted to its need will be provided. Technical assistance will be provided through courses and workshops. Specific environmental guidelines will be formulated, and a protocol for environmental audits of existing projects will be designed. Use of ISO 14000 norms will be promoted.

2. Environmental Quality System	Data about contingencies will be analyzed, and there will be a follow up on the impact of the measures of contingency adopted on the basis of this analysis. As a starting point, an environmental database should be created based, which will gather information on: · Environmental Impact Assessment (EIAs). · Monitoring. · Environmental audits. · Other existing regional studies. Use of environmental quality bio-indicators will be considered.
Instruments for implementation.	Technical assistance to handle a database system and a geographical information system (GIS). Acquisition of necessary computers and software packages for the above purpose.
3. Design of public participation mechanisms.	Development of participation mechanisms. In particular, community consultations regarding the design and implementation of projects in their region, and community consultations as part of the environmental studies.
Instruments for implementation.	Technical assistance on how to develop and channel community participation. Assessment of advantages and disadvantages on the community consulting and participation.. Technical assistance on the elaboration of surveys (key questions and how to ask them, statistical analysis of surveys, and so on), as well as on public audiences, community supervision ,and relations between energy sector enterprises and the communities.

4. Creation of an economic and technical database on generation alternatives.	Geared to stimulate the use of sources of renewable energy such as hydraulic, wind, and solar energies, and facilitate the implementation of this type of projects. This database will generate reliable information on sources of renewable energy (RES) in the country, and will be the best strategy to promote investment in RES projects. Economic and market instruments to support renewable energy sources generation such as fiscal incentives and easy access to technological information on renewable energy sources. International cooperation from countries using this technologies. These countries can also be invited to invest in the country.
Instruments for implementation.	Institutionally, this could be a task assigned trough an agreement or contract between the Ministry of Mines or CONELEC and the Centro de Transferencia y Desarrollo de Tecnología Energética CTTE. Mechanisms to promote/advertise this database to be developed through seminars, visits to the sector and eventually a web page.

Table No. 3 Identification of required mechanisms

Program	**Priority**	**Needs**
Institutional Strengthening	High priority. To be implemented during the first year.	Hiring of personnel. Technical assistance for one year to prepare the environmental management procedures, and environmental handbooks. Hardware, software and training.

Training	High and medium priority.	The following programs have been identified as important: Course of strategic environmental evaluation for the electric sector. Clean technologies for electric generation. Energy efficiency. Community participation on the decision making process of the sector. Environmental evaluations of the projects. Environmental monitoring techniques. Use of bio-indicators on environmental quality evaluation. Projects vulnerability and contingency management of the energy sector. Environmental problematic of the energy sector. Use of remote sensors on environmental evaluation.
Environmental Quality System.	Third priority To be launched on the third year.	Technical assistance on databases implementation and management. Technical assistance on the use and handling of geographical information systems. Exchange of information with other entities involved on environmental issues in regions where electricity or telecommunications projects are being developed.

Community participation mechanisms	High priority	Training in community consultation and relationship with the community. Information to communities about their participation rights. Foster the formation of community leaders in public participation. Develop communication channels among communities, sector enterprises, and CONELEC. Hardware and software to prepare audiovisual and informative material to educate communities in topics related to the electric sector and environmental protection.
Creation of a technical and economic database about generation alternatives.	High priority. To be started on the first year	Develop Inter-institutional mechanisms to create this database. Promote international cooperation of countries where this kind of projects are being developed. Adopt mechanisms to make public the data obtained in order to promote investments on these technologies. Adopt economic and tributary incentives to attain these objectives. Technical assistance on database management.

Table No. 4
Estimated Costs (without taxes)

Program	**US$**
Institutional strengthening for environmental management	200,000
Regulatory framework and support for its implementation	70,000
Training	300,000
Environmental quality system	100,000
Technical and economic database about generation alternatives	230,000
Total	**900,000**

2. PROMEC Indigenous People Framework

Legal Framework.

The Ecuadorian National Constitution acknowledges the nation's multicultural character, providing the legal framework to take into account cultural differences. As a result the state has been gradually responding to indigenous requests while increasing their participation on decision-making processes. Consequently, governmental programs are being implemented at national level, such as, the National System of Bilingual Intercultural Education (DINIEB) and the Program of Indigenous Medicine. The 1998 Constitutional Reform, associated to the Convention ILO 169 recognizes the collective and ancestral indigenous rights, of the so-called nationalities and "*pueblos*", the right to previous consultation, and defined the indigenous circumscriptions as local administrative entities (Art. 68), although the latter lacks specific regulations yet.

In Ecuador there are more than 2325 rural indigenous organisations of different nature and geographic scope: community-based, regional and nation-wide. These organisations that emulating labour unions emerged more than two decades ago, have conserved through time their ethnic and territorial affiliations. Currently an important number of these organisations have built up their administrative and management capacity and skills on designing and implementing development projects, constituting an important vehicle for internal social control.

In 1998, was created the National Development Council for Indigenous People and Nationalities (CODENPE). CODENPE is a governmental institution attached to the Presidency of the Republic of Ecuador, governed by a board so-called the National Council of Indigenous Nationalities conformed by 12 indigenous delegates and the Executive Director. CODENPE counts, among a number of governmental representatives, with delegate who represents the President of the Republic. CODENPE is in charge of defining the indigenous national policies, as well as implementing and supervising projects targeting indigenous people. It is also important to highlight that in the past elections 27 rural indigenous mayors and a Provincial prefect were elected by popular vote. Among other things, the role of these local governmental representatives is to co-ordinate the implementation of projects with the above-mentioned organisations, NGOs and other governmental agencies.

Social, cultural characteristics and policies.

It can be said that, the last census (1990) and post-data gathered referring the number indigenous population is flawed and sometimes even contradictory. Estimations of the indigenous population since the last 1990 census varies accounting between 35% and 20% of the total Ecuadorian population. The 12 indigenous nationalities present a great cultural diversity, including their own languages, sharing traditions among each nationality, whereas distinguishing from the national cultural context. The Quichua nationality is the largest widespread in both the Sierra, and the Amazon regions. The Amazonian nationalities are Shuar, Achuar, Huao, Cofán, Secoya-Siona, Záparo- and on the coastline ones are Awas, Emberá, Tsachila, Chachi, Mateños- Huancavilcas and Punas.

Approximately 47% of the indigenous population are extremely poor, evidencing for example, very high percentage illiteracy among rural women (50 %). Although only 50% of indigenous lands are considered to be officially titled, land possession and adjudication is based upon customary (ancestral) ownership (WB 2000). Land is a critic asset for indigenous people, constituting the main source of self-subsistence food production. However access to land, and land ownership are differentiated according to the regions (sierra, amazon and cost) and their specific historical agricultural structures. The main scarce income sources of indigenous households in rural areas are the product of marginal sales to local markets of agricultural and livestock activities. Temporary rural-to-urban migrations continue to be high due mainly to unequal land distribution and lack of rural employment opportunities and credit. Migrations of some household members according to evidences constitute the alternative to get off-farm employment. Especially for young men employed on non-qualified labour activities (Gender Review WB 2000). Therefore, non-surprisingly indigenous people register high rates of sub-employment and unemployment. Indigenous as rural population among the poorest population accounted an unemployment rate in November 1998 of 21.4 per cent. In Ecuador, it can be said that extreme poverty and ethnicity overlap

Assessment of Development opportunities, impacts and risks.

In Ecuador, rural indigenous people, show a high percentage of basic unsatisfied needs such as, lack of access to electricity and telecommunications services. As mentioned earlier in the document, during the past five years economic and political crisis resulting on the reduction of the State budget has worsened, increasing the number of population under poverty line (WB 2000).

Supplying electricity and communications services in rural areas to people that never have had access represents among other things, a critic input leading to acquire efficiency and competitiveness of the socio-economic performance. Therefore the provision of services to improve interconnectivity is linked to poverty alleviation. Thus, it is necessary to co-ordinate efforts to overcome past problems as the result of policies and actions, which have failed balancing the opportunities of rural areas via a vis urban ones. This is why it is crucial to take into account the specificity of the indigenous populations, as beneficiaries of the Project. To ensure an

appropriate targeting of these indigenous populations, the Project will define the pertinent options to adopt and implement a culturally appropriated development plan.

People's participation is critical to achieve the objectives of the Project. As indigenous populations are key actors, it is necessary to program participatory activities and specific studies from the design phase up to the end of the evaluations, as well as in the implementation and supervision of the Project. To comply with the latter, workshops, focus groups and interviews will be organised in order to achieve the following:

i) define a strategy for consultation by the implementing agencies in each of the Project components, with special emphasis on those, which by definition will benefit the indigenous communities;

ii) integrate and reinforce the mechanisms of consultation already in place to promote inclusion of indigenous populations, such as public hearings;

iii) take into account experiences from previous consultation in the two sectors that could provide feedback for the Project implementation. The analysis will need to identify the existing barriers that prevent indigenous access to the services, and direct the intervention, taking into account their cultural context. The existing barriers and the mechanisms to overcome them will be examined in the context of the communication strategy of the Project; and

iv) provide resources and specialized assistance during Project implementation to ensure efficient provision of services, that maximises the impact of the benefits from the Project by increasing opportunities to generate income in these communities.

Description of the preparation process.

Providing access to electricity and communications services for rural areas results into an improvement in the quality of life. The Project component called *"Extension of Services to Low Income Groups"* has in turn five sub-components with activities, which intend to maximise the benefits derived from the provision of services in rural areas. Among them, the component implemented by the GEF (see annex 4a) will carry out environmental studies and adopt mitigation measures and will ensure that indigenous socio-environmental issues will be thoroughly addressed in the analysis.

Considering the knowledge-gap of modern technologies that is likely to exist between the indigenous people and the rest of the population, activities will be defined accordingly to ensure that indigenous populations will have undiscriminated access to information and capacity building. Activities scheduled for the promotion and development of ICT businesses include pilot sites in territories with a high percentage of indigenous population (Otavalo and Tena). These indigenous in these locations are considered critic-targeted groups for the Micronet Centres.

In these localities, consultations were carried out through focus groups to identify possible opportunities and limitations for establishing E-businesses. Regions with intensive agriculture, textiles and tourism activities have been identified as the most promising sites for the pilot projects. A sub-component will include a strategy to determine and implement the type of training and opportunities to promote businesses for handicrafts and other productive activities of indigenous communities.

The Project will rely on a consultant specialised in indigenous matters for the follow-up and co-ordination with the implementing agencies of the Project in Ecuador to ensure that indigenous concerns will be taken into consideration in the design and implementation of the Project as previously discussed. The Project will establish relationships and exchanges with the Prodepine Project (World Bank Project) to exchange and analyse accumulated experiences on investments in infrastructure. It will also benefit from the Prodepine project by learning from the participatory methodologies already applied in indigenous community planning, and from the inputs that the latter project could provide regarding the requirements for capacity-building in these communities.

Evaluation of Risks.

The Solidarity Fund -as the recipient of privatisation proceeds assigned to social investment programs- will strengthen its management capacity and will identify specific instruments, which should ensure access for indigenous groups to the programs. In the electricity sector, as well as in communications, FERUM and FODETEL are the main sources of financing to provide electricity and telecommunication services in rural areas, in addition to some funds provided to the Ministry of Energy and Mines for off-grid electrification projects. Mechanisms such as targeted subsidies are used to ensure that the benefits of these expansion programs will reach the poor. However, even though these mechanisms are aimed to achieve greater equity in the delivery of these services, they do not take into account the specificity of indigenous population, which could result in a differentiated access or even prevent access altogether. In this sense, and even though the provision of these services to rural areas do not have negative impacts on the indigenous groups, it is necessary to ensure that subsidies will reach the indigenous sectors. To achieve this goal, indigenous groups will be consulted on the scope of the project, before and during its implementation, on how to anticipate adverse trends and how to mitigate them.

Supervision and Evaluation

The Project will carry out: i) mechanisms during the implementation phase that will provide feedback to the beneficiaries, and ii) a more in-depth evaluation at the mid-term review of the Project to allow redefinition or reinforcement of actions by the implementation agencies.

Strategy for participation

A specific consultancy will be hired to define the consultation strategy that will take into consideration the participation of indigenous communities into the different components of the Project. This preliminary activity seeks to achieve a consensus on the priorities and local request from indigenous groups relative to the provision of services to be provided under the Project. The definition of the strategy will be completed before the date of Project's effectiveness and will include information on socio-economic aspects, organisational structures and needs for capacity-building activities. To guarantee full local participation, the consultants will seek inputs from local governments, institutions and civil society organisations (i.e. NGOs) to guide the implementation of the Project.

Simultaneously, a consultancy will be carried out to define the communication strategy and address the issue of indiscriminate access to information. At the same time, these consultancies will carry out an analysis of the mechanisms already in place, to identify whether there is a need to strengthen the intercultural inclusion. The consultation and communication strategies will need to be implemented prior to the implementation of the Project. This in order to guarantee that they will provide meaningful inputs into the realisation of the different sub-components such as the pilot-projects for rural electricity and telecommunications services and the pilot projects for the development of ICT-based business services in peri-urban and rural zones.

It will be necessary to ensure that the subsidies granted in the provision of rural electricity and promotion of efficient use of electricity will reach the targeted indigenous populations, and that there will be full compliance with the environmental guidelines. On the other hand, the provision of electricity into remote areas will take into account the limitations imposed by dispersed populations, to ensure that alternative energy systems and adequate maintenance scheme will be identified that could reach these populations.

Cost Estimate and Action Plan for Indigenous Peoples, and consultations to other beneficiaries and stakeholders

Activity	Priority	Implementation Period	Products	Costs in USD

Consultation ● Define mechanisms to include indigenous requests ● Ensure indigenous participation into the existing consultations mechanism ● Define needs that link consultation and communications activities targeting indigenous and other beneficiaries and stake holders ● Ensure participation of beneficiaries and other key local governments and NGOs representatives	1	10 months. The consultation strategy design is an effectiveness condition.	>Consultation strategy implemented > Mechanisms to favor inclusion in public and private agencies implemented	270,000.00 200,000.00
● Definition of actions, responsibilities and schedule of indigenous Plan ● Follow-up and supervision of indigenous issues.	1	22 months	>Services provided and subsequent improvement in quality of life >Informed beneficiaries. Documentation published >Assistance in capacity-building and training activities implemented	150,000.00
● Evaluation of indigenous beneficiaries and opinion polls ● Evaluation of other beneficiaries and opinion polls	2	5 months. Second year of Project implementation 5 months. Second year of Project implementation	>Project impact on indigenous communities has been assessed	80,000.00 100,000.00
TOTAL				**800,000.00**